DOCTORAL THESIS

The decision to internally generate or outsource risk management activities.

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THE DECISION TO INTERNALLY GENERATE OR OUTSOURCE RISK MANAGEMENT ACTIVITIES

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by

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ABSTRACT

Risk management is a recognised business discipline with a broad supporting infrastructure in academe and professional practice. Development of a sound framework of risk oversight, risk management and internal control is fundamental to good corporate governance (ASX Corporate Governance Council, 2008; ASX Markets Supervision, 2009). The board and the senior management of Australian listed companies have a statutory duty to develop, implement, oversee and report on an effective system of risk management (structures, policies, and procedures and culture) to identify, assess, treat and monitor risk to support achievement of the organisation's objectives. This is articulated in the ASX Corporate Governance Principles and extended under the ASX listing rules which are given legal authority by the Corporations Act 2001. The services required to support a company's risk management activities can be conducted in house by employees of the company, outsourced to professionals such as accounting practices or other professional consultants or by a combination of internal and external sources.

This study examines internal and external factors that influence the decision to internalise or outsource risk management activities using the theoretical framework of TCE (transaction cost economics). A transaction's attributes can be characterised by the three broad principal dimensions of asset specificity, uncertainty and frequency according to TCE. It is these dimensions which determine why some transactions are internalised and directed by managers in a hierarchy and others are outsourced in the market to external suppliers. Four hypotheses are developed and operationalised using a unique data set combined with archival data from company annual reports. A survey questionnaire sent to ASX listed companies requesting information about their risk management function for the financial year ending 2009 achieved a sample of 271 companies. Linear and logistic multivariate regression analysis is used to test the hypotheses and explain the governance choice for risk management activities for ASX listed companies.

Results suggest 46 per cent of Australian listed companies outsource risk management activities. Financial reporting, compliance and operational risks are identified as the top three categories of risk management and are the top three risk

priorities. Environmental, sustainability and climate change are the least identified categories of risk management with lowest priorities given by respondents. Risk associated with human capital and the environment are the most frequently outsourced categories.

Broadly in line with the TCE propositions expenditure on research and development, staff turnover in risk management relative to other service functions and environmental uncertainty measured in terms of technological change and transaction frequency is associated with less outsourcing of risk management activities. Uncertainty due to environmental diversity measured by the number of subsidiaries and recent restructures, acquisitions or mergers is associated with more outsourcing of risk management activities. Behavioural uncertainty related to new staff is also associated with more outsourcing. Contrary to the theoretical predictions of TCE, volatile sales are associated with more outsourcing and competition and overseas sales are associated with less outsourcing of risk management activities. Training and contract duration, hypothesised as indicators of asset specificity, are associated with more outsourcing. Big4 supplier is associated with more outsourcing of risk management activities and leverage is associated with less outsourcing of risk management activities. Financial distress is associated with the decision not to outsource in the whole sample of companies and associated with more outsourcing for the subsample of companies that do outsource risk management activities. Capital intensity is associated with more outsourcing in the whole sample of companies and there is a marginal association with less outsourcing for the subsample of companies that do outsource risk management activities.

This study is motivated to extend the boundaries of research into companies' risk management practices. Limited comparable studies of risk management activities have been found to have been conducted in Australia or internationally and the accounting discipline has concentrated on internal audit. The research period of 2009 is important because it is the first full reporting year following the implementation of the revised ASX Principle 7: Recognise and Manage Risk which extended the scope of management's responsibilities. Application of TCE to the risk management function contributes to the body of knowledge by expanding the scope of

the theory's application to an area of corporate governance which incorporates operations, compliance, financial reporting and strategic imperatives. Increasing our understanding of risk management practices benefits organisations, accounting professionals and regulators concerned with governance practice and enables policy development to be based on informed research. This study undertakes to investigate directly the factors influencing the risk management sourcing decision. This knowledge, by increasing and promoting understanding of the issues, can be used by managers and professional bodies to enhance their decision making on the choice of governance for risk management.

DECLARATION

This thesis is submitted to Bond University in fulfilment of the requirements of the degree of Doctor of Philosophy. This thesis represents my own original work towards this research degree and contains no material which has been previously submitted for a degree or diploma at this University or any other institution, except where due acknowledgement is made.

Jacqueline Christensen

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CHAPTER 1
INTRODUCTION

1.1 OVERVIEW

The activities facilitating risk management can be generated internally, outsourced to external consultants such as accounting professionals or by a combination of both. This research seeks to determine factors influencing this source of supply using transaction cost economics (TCE) as a theoretical framework. Risk management is a recognised discipline in business with a broad supporting infrastructure in academe and professional practice. There are many categories of business risk, including numerous internal and external sources (Hillson, 2007) [1] . Hillson (2007) outlines three predominant factors that have focused recent international attention on risk management and these are corporate governance, corporate failures and regulation.

International governance regulations reflect that the concepts of corporate governance, internal control and risk management are inter-dependent (Spira and Page, 2003; Woods, 2009). The 1992 Cadbury Report in the United Kingdom (U.K.) was one of the first policy initiatives legitimatising the widening of organisational control practices to encompass risk management and corporate governance issues (Bhimani, 2009; Maclean, 1999). Cadbury (1992) resulted in the first release of the Combined Code on Corporate Governance in the U.K in 1998. Previously, the primary focus of risk management guidelines had been internal controls over financial reporting. The inclusion of enterprise wide risk management into the governance spectrum was endorsed further following the Turnbull Report[2] in 1999. This report resulted in the publication of a guidance for directors on the Combined Code extending requirements beyond the financial sphere to include broader business risks, explicitly linking internal

[1] Types of risk management cited by Hillson (2007) include strategic, corporate governance, financial business continuity and disaster recovery, reputational, marketing, operational, project, environmental, legal, contract, technical, fraud and counter terrorism.

[2] A report prepared by an Internal Control working party of the Institute of Chartered Accountants in England and Wales and endorsed by the London Stock Exchange under the chairmanship of Nigel Turnbull. The objective of the Turnbull Report was to provide a framework of risk management for U.K listed companies to implement the requirements relating to internal controls in the Combined Code on Corporate Governance (1998).

control over financial reporting to risk management (Arena, Arnaboldi, and Azzone, 2010; Spira and Page, 2003).

Formal recognition of risk management can be attributed to a number of factors including major financial and business scandals in the 1980's and 1990's in the U.K, for example Mirror Group, Barings Bank, Polly Peck, Maxwell Corporation (Arena et al., 2010). The first few years of this century provided a further series of high profile corporate collapses internationally (for example Enron, WorldCom, HIH and OneTel), events which could be partly linked to a failure to effectively manage risk (Francis and Armstrong, 2003). More recently we have seen heightened concern and focus on risk management with the advent of the current global financial crisis in 2007 (KPMG, 2010). The Organisation for Economic Co-operation and Development concluded the global financial crisis could be partly attributed to failures and weaknesses in corporate governance arrangements including lack of risk management (Kirkpatrick, 2009). Mikes (2009) observes Chief Executive Officers (CEO) are indicating one of the most importance lessons flowing from the global financial crisis is to make risk management a strategic imperative.

Internationally, regulators have made timely responses to the aforementioned events and enacted legislation and guidelines which have significantly expanded public policy in the corporate governance and risk management arena (Beasley, Clune, and Hermanson, 2005). The Sarbanes-Oxley Act (SOX, 2002) in the United States (U.S.) and the Combined Code on Corporate Governance (Financial Reporting Council, 2003, 2008) in the U.K. contain key elements requiring public companies to incorporate effective systems of risk oversight. The authorities governing Australian Stock Exchange (ASX) listed companies have sought to minimise the risk of further major failures by tighter regulation of risk management systems (Woods, 2009). The ASX listing rules are given legal authority by the Corporations Act (2002) and impose disclosure and certification requirements on risk management through the Corporate Governance Principles (ASX Corporate Governance Council, 2003, 2007a) - hereafter referred to as the 'Principles'.

The aim of this study is to identify factors influencing a company's decision to internally generate or outsource the activities required to effectively manage risk and

thus comply with their statutory obligations. Given the regulatory and legislative burden imposed on companies, the overarching objective is to increase our understanding of the issues in order that organisations, accounting professionals and regulators concerned with governance practice and policy development can base decisions on informed research.

This chapter proceeds as follows. Section 1.2 provides an overview of the regulatory context governing company's risk management activities and section 1.3 summarises the research question. Section 1.4 provides the motivation for the study and section 1.5 outlines the contribution made to current research. Section 1.6 describes the conceptual framework of transaction cost economics and section 1.7 provides an overview of the research methodology. Section 1.8 summarises the results and section 1.9 provides definitions for the key elements of the research. Section 1.10 provides a structure for this thesis.

1.2 REGULATORY BACKGROUND

The ASX Corporate Governance Council released the first edition, Principles of Good Corporate Governance and Best Practice Recommendations, in March 2003. This was after a request by the Australian Securities and Investment Commission and government to take a leadership role in formulating a non-legislative response to the corporate governance issues arising after the aforementioned series of high profile corporate collapses in Australia and overseas (ASX Corporate Governance Council, 2008). The aim of the Principles is to provide a flexible non prescriptive approach to corporate governance, focusing on disclosure of actual practice, rather than mandating a particular practice. However, this is tempered by the requirement to provide an explanation to report justifications of deviations from the Principles. This has put considerable pressure on listed companies to adopt the recommendations contained within them or the stakeholders of a company could perceive noncompliance with the principles as an adverse signal (Kohler, 2005).

The 2003 version of the Principles was updated in 2007 reducing the number of principles from ten to eight and the number of recommendations from twenty-eight to twenty-six to remove regulatory overlap with the Corporations Act (2002) and the

accounting standards. The board and management's responsibilities for risk oversight, management and disclosure are more clearly defined in the second edition, Corporate Governance Principles and Recommendations (2007). A key change is the expansion of the scope of Principle 7: Recognise and Manage Risk to reflect the heightened concern and increasing expectations of stakeholders with regard to risk management (ASX Corporate Governance Council, 2008).

The changes made to Principle 7: Recognise and Manage Risk place a greater emphasis on reporting and disclosing the effectiveness of risk management across a broader range of risks (KPMG, 2007). Previously, the focus was on the risks surrounding financial reporting. The scope of risks has been broadened by adopting the concept of material business risks. The ASX Corporate Governance Council (2008) defines these as "the most significant areas of uncertainty or exposure, at a whole-of-company level, that could have an adverse impact on the achievement of company objectives". Examples of external environmental factors impacting a company's risk profile include industrial sector outlook, market competition, industrial relations, foreign exchange, interest rates and commodity prices and changes in government policy and regulation. Internal environmental factors include occupational health and safety, environmental impact, consumer protection/trade practices, financial controls and reporting, technology reliability, production capacity and people and skills (ASX Corporate Governance Council, 2008). Hence, there is clarification that material business risks involve financial and non-financial risks.

The scope of the obligations contained in the Principles (2007) is extended considerably under the ASX Listing Rules. The ASX listing rules are contractually binding between the ASX and listed entities and are enforceable under sections 793C and 1101BN of the Corporations Act (Commonwealth of Australia, 2002). The Corporations Act also imposes a number of further requirements on a company's management with respect to the risk management of financial reporting. Under section 295A of the Act, the Chief Executive Officer (CEO) and Chief Financial Officer (CFO), or person's acting in these roles, must provide the directors of the company a written declaration attesting to the integrity of the financial reporting process. Companies must also be aware of their obligations under section 299A to include in the directors' report

information required to make an informed assessment of companies' operations, financial position, business strategies and prospects for future financial years.

Three ASX listing rules covering mandatory requirements are applicable to an entity's risk management practices. The prevailing rule is ASX listing rule 4.10.3 which requires companies to disclose in a Corporate Governance Statement in the annual report the extent to which the company has followed the Principles. Companies are required to explain their different governance practices with respect to the Council's recommendations. ASX listing rule 12.7 directs the top 500 listed companies in the Standard and Poor's Top 500 to have an audit committee and those in the Top 300 to have an audit committee in accordance with Principle 4[3]. Guidelines for Principle 4 include the audit committee's responsibility to review the risk management and internal control systems.

ASX listing rule 3.1 is a continuous disclosure provision requiring timely disclosure of any information that could have a material impact on the valuation of the company's securities. Therefore, ASX listed companies have an obligation to make an announcement to the securities market in relation to some or all their material business risks and/or changes to those risks, where the risk or change is likely to have a material impact on the price or value of a company's securities. In addition, further support for this rule is provided in section 674 of the Corporations Act which imposes statutory liability for its breach in certain circumstances under civil (s. 1317) and criminal (s. 1311) provisions.

1.3 THE RESEARCH QUESTION

In summary, the board and the senior management of Australian listed companies have a statutory duty to develop, implement, oversee and report on an effective system of risk management. This requirement is articulated by the ASX Corporate Governance Council in the Corporate Governance Principles and Recommendations (2007a) and given authority by the ASX Listing Rules with legislative backing from the Corporations Act (Commonwealth of Australia, 2002). The

[3] Principle 4: Safeguard integrity in financial reporting makes recommendations with regard to the composition, operation and responsibilities of the audit committee.

issue of risk is addressed in a number of the Principles but predominantly in Principle 7: Recognise and Manage Risk.

The activities required to achieve this objective can be conducted in house by employees of the company, outsourced to professionals such as accounting practices or other professional consultants, or by a combination of internal and external sources. TCE predicts the costs of these alternative governance structures vary depending on the characteristics of the transaction within each individual company and the company selects the governance structure with the lowest costs for them. An answer to the research problem is provided using the theoretical framework of TCE. The research question is 'what are the internal and external factors influencing the decision to internalise or outsource risk management activities?'

1.4 MOTIVATION

Limited research exists on the characteristics of companies' risk management systems in individual organisational settings (Bhimani, 2009). Prior research, overseas and in Australia, has tended to focus on specific functional areas of risk management such as internal audit, financial risk and operational risk. In a U.S. study, Widener and Selto (1999) surveyed 600 randomly selected large companies (with greater than 500 employees) in 1996 and 71 percent of the respondents reported they use internal audit. In a replication of the Widener and Selto (1999) study conducted in the Netherlands in 2003, Speklé et al., (2007) reported that 57 per cent of companies surveyed use internal audit. Two notable studies of Australian listed companies have examined the determinants of outsourcing the internal audit function (Carey et al., 2006) and use of internal audit (Goodwin-Stewart and Kent, 2006) using data from 2000 and earlier. Carey et al., (2006) reported that only 31 per cent of 304 companies surveyed in 1998 engaged internal audit services and Goodwin-Stewart and Kent (2006) reported that only 34 per cent of 450 companies surveyed in 2000 used internal audit.

Internal audit is intrinsically tied to the risk management mechanism of a system of internal controls and all organisations have some form of risk management either consciously or sometimes without realising it (Standards Australia/Standards New Zealand, 2004). Organisations reporting they have no internal audit function could have

a different perception of internal audit to those in professional practice and academe. Given the blurred boundaries between defining internal audit and many of the risk management activities, a more meaningful approach is to examine the issue holistically by providing a wider context in which companies can inform researchers of the range and nature of their activities.

From a theoretical perspective, there is an extensive growing body of empirical TCE research across business disciplines, for example, economics, organisation, law, sociology, marketing, finance, accounting and operations management (Geyskens, Steenkamp, and Kumar, 2006). However, its application in accounting is relatively scarce (Macher and Richman, 2008) and mainly confined to management accounting, for example, Carey et al., (2006), Speklé et al., (2007) and Widener and Selto (1999). In addition, Bhimani (2009) proposes the relationships between management accounting, corporate governance and risk management have been addressed only to a minimal extent in the academic literature, but are increasingly intertwined and inextricably interdependent. Applying the TCE framework in the context of risk management extends the application of the theory.

From a regulatory perspective, evidence from this research has implications for those involved in designing and implementing corporate governance risk management policy. Simkins and Ramirez (2007) maintain current disclosure requirements with respect to risk management are inadequate given it can have a serious adverse impact on business. However, implementing recommendations incurs costs for companies and these costs must be compared with related benefits (Christensen, Kent & Stewart, 2010). The overarching objective of this research is to increase understanding of this critical aspect of how the risk management function is implemented in practice incurring minimal transactions costs.

In summary, this study is motivated by the need for an empirically tested established theoretical framework to explain a company's decision to outsource, internally generate or use a combination of both to support their risk management activities.

1.5 CONTRIBUTION

This study examines the factors determining the sourcing of risk management services by exploring the internal and external characteristics of a company's governance structure and contributes to the existing literature in a number of ways.

Limited comparable studies of risk management activities have been found to have been conducted in Australia or internationally. Given the emergence of enterprise risk management, research is required to deepen our understanding of the phenomenon. As yet there are few contributions exploring how enterprise risk management works in practice and how it is organised and contributes to a risk management style (Arena et al., 2010; Power, 2009). A number of studies have applied TCE to explain the sourcing decision for internal audit activities (Speklé et al., 2007; Widener and Selto, 1999) and managerial advisory services (Kent, 2011). Application of TCE to the risk management function as encapsulated in the ASX Principles is in a research context; applicable and familiar to all listed companies regardless of size, industry affiliation and resource constraints. In addition, it contributes to the body of knowledge by expanding the scope of the theory's application to an area of corporate governance which incorporates operations, compliance, financial reporting and strategic imperatives.

Second, it is timely given the increased focus on risk management activities in light of the recent global financial crisis and the additional compliance burden placed on listed entities by the revised Corporate Governance Principles in Australia. This study is undertaken in an important period because data has been collected from companies for 2009. This is the first full reporting year following the implementation of the revised Principle 7: Recognise and Manage Risk.

Third, this research creates a unique data set by combining data obtained from a survey sample of 271 companies listed on the ASX in 2009 with archival data from the sample company's annual reports. The survey sample is representative of the ten industry sectors as classified by the GICS[4].The study provides up to date information on companies' risk management practices. The governance choice for risk management is identified and data is collected on the fourteen categories of material business risks

[4] Global industry classification standard.

covered under a company's risk management system. In following a 'principles'[5] based approach, Australia provides scope for considerable variation in risk management practices when compared to mandatory regulatory environments such as SOX (2002) in the U.S. (Christensen, Kent, and Stewart, 2010).

Managers rarely consider the transaction costs of making governance decisions from a theoretical viewpoint, although they have an intuitive awareness of their sources and compare the costs and benefits of the alternatives (Gatignon and Gatignon, 2010). This study undertakes to investigate directly the factors influencing the risk management sourcing decision. This knowledge, by increasing and promoting understanding of the issues, can be used by managers and professional bodies to enhance their decision making on the choice of governance for risk management.

1.6 CONCEPTUAL FRAMEWORK OVERVIEW

This study uses TCE as a theoretical framework to identify those factors influencing a company's decision to internally generate or outsource the activities required to effectively manage risk. TCE views the company as a governance structure based on a series of contractual agreements (Alchian and Woodward, 1988) resulting in a succession of transactions assisting the production process. Transaction costs are those associated with contracting for the procurement of goods and/or services and can be divided into ex ante (drafting, negotiating and safeguarding the agreement) and ex post transaction costs of subsequent administration (monitoring, evaluation, enforcing the agreement) (Williamson, 1985). Distinct from production costs, transaction costs are the economic equivalent of friction in physical systems and arise as a result of the need to contract (Williamson, 1989). Based on the assumption of profit maximisation, the objective is to minimise the sum of the production and transaction costs.

TCE began with Ronald Coase (1937) in the economics discipline with his examination of the issue of economic organisations and why companies substitute markets as the principal means of coordinating activities. Coase's fundamental insight is that companies and markets are alternative governance structures differing in their

[5] A 'principles' based approach places greater reliance on laying out key objectives, providing guidance and focusing on outcomes rather than issuing a list of detailed prescriptive rules (The Financial Services Authority, 2007).

transaction costs. However, the theoretical development of TCE is predominantly associated with the extensive works of Williamson (1973, 1979, 1981a, 1981b, 1983a, 1983b, 1985, 1988a, 1988b, 1989, 1991a, 1991b, 1993, 2002, 2005, 2008a, 2008b; Williamson, 2009). Williamson proposes that transactions can be characterised by three broad principal dimensions and these are asset specificity, uncertainly and frequency with identifiable relative qualitative and measureable quantitative characteristics. Williamson's seminal contribution to the theory is the proposition that economising on transaction costs is realised by assigning a transaction to a governance structure according to these three dimensions.

1.7 METHODOLOGY

Hypothesises are developed for each of the TCE framework's three dimensions predicting a governance mode for the sourcing of an ASX listed company's risk management requirements. Archival data is insufficient to test the hypothesis as information relating to the characteristics of a company's risk management function is not obtainable from publically available sources such as databases. Managers within the companies have information pertaining to the hypothesised variables. A questionnaire was sent to the Chief Financial Officer (CFO) or the company secretary of 1811 companies listed on the ASX as at 31st December 2009 in a six week period from March to May 2010. Each respondent was asked to complete a questionnaire which included items to measure aspects of the three TCE dimensions (asset specificity, uncertainly and frequency). A response rate of 17.10 per cent was achieved. The survey data is combined with archival data from the respondent company's annual reports. Linear and logistic regression are used to test the hypotheses developed.

1.8 SUMMARY OF RESULTS

Significant factors related to the internalisation of risk management activities for ASX listed companies are higher expenditure on research and development, lower staff turnover in risk management relative to other service functions, greater technological uncertainty, increased competition, higher proportion of overseas revenue, transaction frequency, financial distress and leverage. Factors significantly related to outsourcing risk management activities include higher sales volatility, greater number of subsidiaries,

more diverse operating environments, recent mergers, acquisitions or restructures and a recent change in the CEO. Financial distress is associated with more outsourcing for the subsample of companies that do outsource risk management activities. Reputation of the external supplier and capital intensity are also associated with more outsourcing.

Results from the survey of ASX listed companies indicate risk management activities in Australia are predominantly sourced in house, evidenced by 54 per cent of the sample companies conducting all activities in house and 41 per cent outsourcing less than 50 per cent in 2009. Survey respondents indicate the risks associated with human capital and the environment are the most frequently outsourced risk management activities. Professional service providers, other than accountancy companies, and external auditors are the primary external providers of risk management services. Fifty four per cent of respondents cite access to expertise as the primary motivation for outsourcing, with strategic importance cited by 55 per cent of respondents as the most important reason to maintain the risk management function in house.

1.9 DEFINITIONS

This section provides definitions and descriptions for key elements of this study. The first key definition is material business risk. This is the risk posed by corporate decisions resulting in economic loss (Francis and Armstrong, 2003). This study is concerned with the management of material business risks for ASX listed companies. The ASX Council (ASX Corporate Governance Council, 2007b, p. 38) defines material business risks as:

"Risks that could have a material impact on a company's business. They can include but are not limited to: operational, environmental, sustainability, compliance, strategic, ethical conduct, reputation or brand, technological, product or service quality, human capital, financial reporting and market-related risk".

The second definition is 'risk management' which is inherent in many facets of business. The underlying premise of risk management is to preserve value for shareholders and other stakeholders (COSO, 2004). Risk oversight is a core function of a company's board of directors complimenting an organisation's strategy formulation

and execution (ASX Corporate Governance Council, 2005). At a minimum, the oversight process must review the establishment, implementation and effectiveness of a risk management system. Management are responsible for the development of the system (structures, policies, and procedures and culture) to identify, assess, treat and monitor risk to support the achievement of the organisation's objectives. Development of a sound framework of risk oversight, risk management and internal control is fundamental to good corporate governance (ASX Corporate Governance Council, 2008; ASX Markets Supervision, 2009). Risk management and internal controls were ranked as the most important audit objectives[6] in a 2002 survey of Chief Audit Executives (Leung et al., 2003).

The third definition, 'enterprise risk management', is described by Arena et al., (2010) as the culmination of the risk management resurgence that started in the 1990s. Enterprise risk management has emerged as the new paradigm in response to the growing expectations of stakeholders demanding greater oversight of risk management (Beasley et al., 2005). It is recommended the board, in its oversight of risk management, should not focus on financial reporting risk in isolation but adopt an enterprise wide approach which includes strategic, operational and compliance. This is indicated in the following statement by the Group of 100 (Deloitte and 100, 2008, p. 2):

"The Board's oversight of risk management should encompass enterprise-wide risks including strategic, operational, financial reporting and compliance risks. The assurance provided by the Chief Executive Officer/Chief Financial Officer certification should focus on financial reporting risks and controls as well as such other risks and controls requiring assurance as specified by the Board."

The fourth definition concerns 'risk management frameworks'. The heightened focus on formal risk management had led many companies to conduct in depth assessments of their existing risk management systems and anecdotal evidence suggests many companies are formalising their practices or adopting new more holistic approaches at the enterprise level. The ASX Council (ASX Corporate Governance

[6] The mean for risk management and assessment was 6 out of 7 for importance with 74 per cent of respondents giving it a 6 or 7 rating, second only to monitoring and effectiveness of internal controls with a mean of 6.3 out of 7 and 91 per cent of respondents giving it a 6 or 7 rating (Leung et al., 2003). (Leung, Cooper, and Robertson, 2003)

Council, 2007c, 2008) recommends a number of Guides for implementing Principle 7: Recognise and Manage Risk[7]. The Committee of Sponsoring Organizations of the Treadway Commission enterprise risk management model and the Australian Standards/New Zealand Standards Risk Management 4360:2004[8] are recognised as the preferred global frameworks to ensure consistency with other countries' risk management and internal control frameworks, such as the Combined Code on Corporate Governance (Financial Reporting Council, 2008) in the U.K. and SOX (2002) in the U.S. Companies must assemble resources to develop and implement systems of risk management to suit their individual requirements within these formal frameworks.

Finally, internal sourcing and outsourcing are defined. Internal sourcing is when the company employs experts within the company in an employer/employee relationship and is frequently referred to as 'hierarchical' or 'vertical integration'. The concept of outsourcing refers to the procurement of products or services from sources external to the organisation (Lankford and Parsa, 1999) as an alternative to internal production (Aubert, Rivard, and Patry, 2003). Outsourcing is a typical example of what is traditionally known in theory and practice as the 'make or buy decision' (Arnold, 2000), where a significant contribution is made by an external vendor of the physical or human resources associated with an end product or service. In the service context the make or buy decision is the choice between the company employing experts internally or using contractors in the market (Kent, 2011).

1.10 STRUCTURE OF THIS THESIS

This thesis is presented in six chapters, including this introductory chapter. A brief overview of the remainder of this thesis follows:

Chapter 2, titled "Theoretical Framework and Hypothesis Development", describes the theoretical framework of Transaction Cost Economics (TCE) on which this study is based. It applies it in the context of a company's risk management function to predict the most efficient form of governance with respect to outsourcing or

[7] This study focuses on one of eight guiding principles contained in the ASX Corporate Governance Council in the Corporate Governance Principles and Recommendations (ASX, 2007), discussed in detail in further sections.

[8] In November 2009 Australian Standards/New Zealand Standards Risk Management 4360:2004 was replaced by the new international standard for risk management, AS/NZS 31000:2009 Risk Management.

employing internal experts. In particular it applies the three transactional dimensions of asset specificity, uncertainty and frequency developed by Oliver Williamson. Hypotheses are developed to operationalise the three dimensions to predict the most efficient form of governance for transactions involved in the sourcing decision for ASX listed companies' risk management activities.

Chapter 3, titled "Research Methodology", describes the development of the research instrument used to measure each of the three TCE dimensions. The process of constructing reliable and valid measures for each of the TCE dimensions involving the generation, development and refinement of questionnaire items and scales is described. Following an extensive cross-disciplinary review of the literature on governance choice, survey questionnaire items and archival proxies from databases (FinAnalyis, Reuters, Bloomberg and CapitalIQ) are assembled. Quantitative data on resources allocated to risk management and qualitative data to measure the TCE dimensions and scope of the risk management activities are explained. A summary of the variables used in the statistical modelling to predict the governance choice for risk management activities for ASX listed companies is presented.

Chapter 4, titled "Research Protocol", provides a discussion of the development, refinement and administration of the research instrument. The survey questionnaire was distributed to all ASX listed companies by mail and electronic methods. The aim of the survey questionnaire, distributed to a large sample of ASX listed companies, is to capture information with respect to their risk management activities. Data obtained is used in conjunction with archival data from annual reports for statistical analyses to address the research question.

Chapter 5, titled "Results and Analysis", presents the results from descriptive statistics of the data collected from the sample of surveyed companies and corresponding archival data employed in the multiple and logistic regression analyses. The results of multiple and logistic regression models specified for identifying the factors influencing a company's decision to internally generate or outsource risk management activities are reported.

Chapter 6, titled “Discussion and Conclusion”, presents a summary of the study’s findings and discusses the contribution made and implications for stakeholders. Limitations are identified and opportunities for future research are identified.

CHAPTER 2
LITERATURE REVIEW AND THEORY DEVELOPMENT

2.1 INTRODUCTION

Grant (1996) describes theories of the firm as conceptualisations and models of business enterprises which explain and predict their structure and behaviours. There are a number of alternative theories explaining the existence of the firm from the economics and organisational disciplines (Grant, 1996). This study relies on transaction cost economics (TCE) to predict which risk management activities are conducted in house and which are outsourced in the market.

The theoretical framework of TCE relies on a number of underlying contextual assumptions including profit maximisation, bounded rationality, opportunism and risk neutrality. However, the predictive power of the theory lies in identifying transactions with the specific dimensions of asset specificity, uncertainty and frequency. A number of empirically tested hypotheses are developed from these dimensions which describe the extent to which internal and external company specific factors influence the decision to internally generate or outsource those activities that collectively constitute the risk management function.

This chapter proceeds in the following manner. Section 2.2 provides an overview of the development of the theory of TCE and a review of the relevant literature. Section 2.3 discusses the alternative governance choices for risk management. Section 2.4 provides an overview of the underlying assumptions of TCE. Section 2.5 discusses the TCE transactional attributes and their dimensions, and develops hypotheses for each to predict the most appropriate governance mechanism for risk management activities for ASX listed companies. Section 2.6 discuses complementary theoretical frameworks on which this study draws. Section 2.7 describes the control variables used in the study and section 2.8 concludes this chapter with a summary.

2.2 TRANSACTION COST ECONOMICS

This study applies the TCE framework to the sourcing decision ASX listed companies face when undertaking their risk management activities. It provides an

explanation for why companies internally generate risk management activities or source them from an external supplier such as an accounting company or other professional consultant.

Transaction cost economics (TCE) is described as a synthesis of institutional economics, organisational theory and contract law (Chiles and McMackin, 1996; John and Weitz, 1988). The breadth of TCE research includes a variety of disciplines including sociology, marketing, finance, accounting and operations management (Geyskens et al., 2006). TCE has become the predominant theory for explaining the boundaries of the company, that is, which activities are likely to be governed internally and which are outsourced in the market (Geyskens et al., 2006).

2.2.1Theoretical development of TCE

It is generally accepted that the antecedents of TCE began with Ronald Coase's 1937 seminal paper 'The Nature of the Firm' which examines the issue of economic organisations and provides explanations for why companies substitute markets as the principal means of coordinating activities. Prior to Coase, classical economics had taken the existence of the company for granted. This was based on the assumption that the business enterprise had low to nonexistent transaction difficulties due to the market mechanism. The market, in its pure form, is the most efficient form of control as prices convey all the necessary information for efficient decision making (Arrow, 1969). Therefore, in the absence of information asymmetry, contracts are complete or costless to amend (Aubert, Rivard, and Patry, 1996b).

Coase (1937) observed that in this efficient market there is no need for companies. Coase's fundamental insight was to recognise that companies' existence was due to varying transaction costs which, distinct from production costs, are the costs of "running the system" (Arrow, 1969, p. 1). Production costs are the combined costs of raw material and/or labour. Although the transaction costs of production are important, especially from an efficiency perspective, alone they are insufficient to explain the governance choice between outsourcing in the market and internal production (John and Weitz, 1988; Klein, Frazier, and Roth, 1990). Transaction costs are those associated with contracting for the procurement of goods and/or services. They are the economic

equivalent of friction in physical systems and arise as a result of the need to contract (Coase, 1937). Whether transactions are organised within the company or between companies across a market is a decision which depends on the transaction costs for each alternative. The more complex the transaction between two different parties in the market, the more costly it is to negotiate, write and enforce a contract and this creates transaction costs.

Coase recognised the importance of modelling transaction costs to indentify the cost of organising information, coordinating behaviour, safeguarding the interests of the transacting parties and monitoring and inducing appropriate behaviours. As these costs, increase they reach a point where it is less costly to internalise them into a collective enterprise called a 'firm' or 'company'. The company then incurs management costs which include those of recruiting, performance evaluation and monitoring. The essence of Coase's argument is that companies and markets are alternative governance structures differing in their transaction costs. Therefore, assuming cost minimisation is the goal, there is a need to align governance structures with the drivers of transaction costs in order to economise (Widener, 2004; Williamson, 1991b).

Geyskens et al., (2006, p. 519) comment "like most influential theories, TCE was not fully developed at the outset, it was refined, reformulated, corrected and expanded in response to new theoretical and empirical developments". However, the theoretical development of TCE is predominantly associated with the extensive works of Oliver Williamson (Williamson, 1973, 1979, 1981a, 1981b, 1983a, 1983b, 1985, 1988a, 1988b, 1989, 1991a, 1991b, 1993, 1998, 2002, 2005; Williamson, Wachter, and Harris, 1975).

Williamson's approach to understanding company behaviour maintains that the main purpose is to economise on transactions costs, which can be divided into ex ante and ex post costs (Williamson, 1979, 1981a, 1981b, 1985, 1989). The ex ante costs are those of establishing a contract and include drafting, negotiating and safeguarding the agreement. The ex post costs are those incurred in subsequently administering the contract. These include monitoring and enforcing agreements and the renegotiation and remedial costs when the contract is not adhered to by both parties. In addition, Williamson extends the scope of direct costs to argue there is also the potential

opportunity costs of making an inferior governance decision, that is, the choice of internal production when outsourcing is the less costly alternative or vice versa.

Whilst Coase identified transaction costs, he also acknowledged the difficulty in measuring them. Williamson resolved this dilemma by proposing that a transaction's attributes can be characterised by the three broad principal dimensions of asset specificity, uncertainty and frequency, all of which have identifiable relative qualitative and measurable quantitative characteristics. This then solves the challenge of directly measuring transaction costs in monetary terms and permits the assignment of a transaction to a governance structure according to these three dimensions. Hence, incorporating Williamson's theoretical developments, TCE explains why some transactions are internalised and directed by managers in a hierarchy rather than outsourced in the open market.

2.3 GOVERNANCE OF CONTRACTS

TCE views the company as a governance structure based on a series of contractual agreements (Alchian and Woodward, 1988) from which a succession of transactions facilitates the production process. Williamson (1979) reiterates that, ideally, contracts between parties should be complete. That is, comprehensive where all relevant future contingencies pertaining to the supply of the good or service are described and priced into the agreement. Accordingly, if all information can be specified, is verifiable and there are no extra costs associated with writing and enforcing the contract (Baiman and Rajan, 2002), the consequences of non performance are relatively predictable. However, not every transaction fits into this schema and bilateral contracts which are complex are invariably incomplete as it is impossible to consider all future contingencies (Riordan and Williamson, 1985; Williamson, 2002).

Williamson (1985, 1991a) discusses three alternate forms of governance contracts. These are outsource in the market, internalise the transaction or an intermediate 'hybrid' option such as a joint venture or strategic alliance. Frequently referred to as 'relational governance', hybrids are considered a viable alternative to internal production when the market no longer delivers the lowest transaction costs

(Geyskens et al., 2006)[9]. However, this intermediate governance option is not considered in this study.

Companies can outsource a contract for risk management activities in the market. The market is a mechanism which co-ordinates the flow of transactions between different individuals and companies through the forces of supply and demand. TCE is based on the assumption that markets are competitive in that there are many potential suppliers (Erramilli and Rao, 1993). Thus, market forces determine price, quantity and time schedule, and the buyer of the good or service selects suppliers by comparing these choices (Malone, 1987). There are a number of factors that can seriously impede the ability to contract in the market. First, it can be impossible to compile a complete list of the ex ante and ex post contingencies with the added complexity associated with estimating the probability of each contingency (Coase, 1937). As a result there are gaps and omissions in the original contract and the subsequent requirement to renegotiate as circumstances change (Williamson, 2002). Contracts can then become too costly to manage and legal costs can be expensive preventing enforcement in court in the event of disputes.

Second, risk management activities are associated with professional services such as accounting, finance and law. The elements of an exchange in the case of services is particularly difficult to evaluate (Aubert et al., 1996b) and this incurs transaction costs. Beaumont and Sohal (2004), in their study of outsourcing in Australia, describe a number of non trivial costs for contracting services out to the market including defining the scope of services and deciding the relevant measures of quality.

Companies consider alternative governance mechanisms as the transaction costs of arms length contracts escalate in the market and become excessive. There are two alternatives, the first being to forgo the transaction altogether. However, this may not be a feasible option if there are legal or commercial imperatives (Williamson, 1985). The second alternative is hierarchy and involves removing the transaction from the market and internalising it within the company. This involves an employment relationship

[9] Incorporating a large informal component, relational governance lacks transparency and is therefore not easily measured or legally enforceable. Sociologists argue that the parties operate their own safeguard mechanisms to guard the future value of the relationship (Geyskens et al., 2006).

where adaptations can be made within the company and decision making can be implemented with incentives and control systems (Williamson, 1985, p. 70). Internalisation is preferable to transacting in the market if there are problems associated with measuring the output[10], resulting in overpricing or undersupply in the market, which Hennart (1993) describes as the transaction costs incurred as a result of 'cheating'.

In contrast to the market mechanism, the hierarchical structure (employee/employer) reduces the incentive to 'cheat' as employees are rewarded as much for their behaviour (obeying directives) as their output (Hennart, 2010). However, the uncoupling of the output/reward nexus invokes the unavoidable consequence of reducing incentives for individuals to produce outputs (work) and the tendency to exert less effort and initiative than if they were self-employed (Hennart, 2010). Consequently, internalisation has its own transaction costs which must be deducted from the gains made from eliminating the market transaction costs. These include the information gathering and set up costs of integration plus the ongoing supervisory and monitoring costs. There are also transition costs to consider if a company transfers from internal to external production. Examples of these include staff reassignment and termination costs, changing from internal to external operations, writing and agreeing new contracts with the external suppliers and monitoring the quality of service (Beaumont and Sohal, 2004).

This study is concerned with transactions involving the sourcing of risk management activities by ASX listed companies in the financial reporting year 2009. Two governance modes are considered[11], internal sourcing through the employer/employee relationship and outsourcing to the market by a contract with an external supplier such as an accounting company or other professional consultant.

[10] TCE attributes these problems to the behavioural assumptions of bounded rationality and opportunism of the market supplier discussed in section 2.4 of this chapter in the thesis.
[11] Examining joint ventures or strategic alliances between ASX listed companies and a risk management service provider is beyond the scope of this research and is acknowledged as a limitation.

2.4 UNDERLYING ASSUMPTIONS OF TCE

TCE has two main underlying contextual behavioural assumptions, bounded rationality and opportunism, which are viewed as the source of many transaction costs across markets and within companies (Williamson, 1985).

2.4.1 Bounded rationality

Bounded rationality is the cognitive assumption on which TCE relies and is based on the premise that economic actors have limited information and limited processing abilities (Williamson, 1985; Williamson et al., 1975). Given these conditions, comprehensive contracting is not realistic or likely to be possible. As TCE is principally concerned with assigning transactions to the most appropriate governance structure to minimise transaction costs, confronted with bounded rationality the costs of planning, adapting and monitoring transactions is a primary consideration (Williamson, 1985, p. 46).

2.4.2 Opportunism

Opportunism is the possibility for economic actors to behave in a self-interested manner to the possible detriment of others, thus giving rise to uncertainty in any exchange (Alchian and Woodward, 1988). In the absence of opportunism, all behaviour could be governed by rules (Williamson, 1985, p. 47). Opportunism, when incorporated with bounded rationality, is described as the ultimate cause for the failure of markets and for the existence of hierarchies (Williamson, 1993).

Williamson (1985, p. 47) describes opportunism as “self-interest seeking with guile”, which, in its blatant form, is lying and stealing but also includes more subtle forms of deceit that can occur before, during and after a contract is agreed. Williamson (1985, p. 64) is not insisting all individuals are continuously opportunistic, but merely some individuals are opportunistic some of the time and identifying when individual parties, including companies, employees and external providers are likely to act opportunistically is difficult.

In a market exchange, buyers and sellers can exhibit opportunistic behaviour that results in incomplete or distorted information, which leads to the problematic condition of 'information asymmetry' (Williamson, 1985, p. 47). As this is rarely transparent pre contract, ex ante screening, along with the creation of ex post safeguards, is necessary (Williamson, 1985, pp. 47, 64). Seeking to assure compliance with a contractual agreement and reduce the associated costs is a motivation for internalising the transaction rather than conducting it in the market.

2.4.3 Risk preference

Williamson (1985) includes a third behavioural assumption, risk preference, which refers to the propensity for humans to exhibit variable risk preference behaviours when making decisions. The risk preference spectrum ranges from risk adversity through to risk neutrality and culminates in risk seeking behaviours. Williamson proposes risk averse decision makers are likely to choose internal organisation, whereas risk seeking decision makers prefer a market exchange when making governance decisions (Chiles and McMackin, 1996). Williamson (1985) adopts an assumption of risk neutrality in TCE on the basis the focus should be on the transaction's attributes rather than the risk attitude of the transactors although he acknowledges the importance of risk preferences for decision makers. He defends this on three bases. First, transactions are conducted at a company level rather than an individual level. Second, neutrality captures central tendencies to facilitate analysis and, finally, to assume otherwise would deflect attention from the core principles of examining efficiency.

2.5 THE THREE DIMENSIONS OF TRANSACTION ATTRIBUTES

In the absence of bounded rationality and opportunism, transaction costs are not a significant factor as complex contracts could be written and all individuals honestly disclose all relevant information (Williamson et al., 1975). However, given these underlying assumptions, TCE maintains there are rational economic reasons for organising transactions in different governance modes. To determine the appropriate governance structure to minimise transaction costs it is necessary to determine the attributes of the transactions. Williamson (1979) proposes these can be characterised by

the three broad principal dimensions of asset specificity, uncertainty and frequency with identifiable relative qualitative and measureable quantitative characteristics.

2.5.1 Asset specificity

Businesses invest in a variety of tangible and intangible assets to facilitate the production function. Some assets are useful in many settings while others are dedicated to a specific purpose and have limited alternative applications. In TCE, the 'specificity' of an asset refers to the value it has outside a particular relationship. Williamson (1981b) proposes that 'asset specificity' is measured by the difference between the cost of the asset and the value in its second best use. This difference in value is a transaction cost and frequently referred to in the literature as a 'quasi-rent'[12]. Recall that contracts are generally incomplete due to bounded rationality and subject to the possibility of post contractual opportunistic behaviour. Hence, as the assets involved in the contract become more specialised, that is, the level of asset specificity increases, problems arise when external suppliers attempt to extract 'appropriable specialised quasi-rents' (Klein, Crawford, and Alchian, 1978, p. 297). As a result, the degree of asset specificity impacts the choice of governance mechanism. TCE proposes that as asset specificity rises, companies favour internalising the transaction as the cost of contracting in the market increases relatively more than the costs of internal production (Aubert et al., 1996b; Klein et al., 1978).

Williamson distinguishes between four main types of asset specificity[13]. Physical asset specificity refers to tangible assets such as plant and machinery where the level of asset specificity is determined by the next best use for the plant or machinery. Site asset specificity refers to the investment made in locating an asset to support particular

[12] The term "composite quasi-rent" was first used by Alfred Marshall, in his Principles of Economics, 8th ed. [1890] 1936, pp. 453-54 and 626. A quasi-rent is the excess above the return necessary to maintain a resource's current service flow, which can be the means to recover sunk costs. Composite quasi-rent is that portion of the quasi-rent of resources that depends on continued association with some other specific, currently associated resources. Marshall offered the example of a steel mill that locates near a public utility and makes an investment, the profitability of which depends on being able to buy power at some given price. Once the steel mill incurs costs that become sunk, the power company could raise power prices. The steel mill continues to operate so long as the new marginal cost does exceed marginal revenue, even though the sunk costs are not being recovered. Marshall recognized the danger of parties with sunk costs relying on those in a position to expropriate composite quasi-rents (Alchian and Woodward, 1988).

[13] In earlier works Oliver Williamson also discusses brand name capital and temporal as other types of asset specificity.

transactions. Dedicated asset specificity refers to a general purpose asset purchased with a particular trading relationship, which results in excess capacity if the trading relationship ceases. The fourth type is human asset specificity, which refers to the time and effort invested to acquire the company specific knowledge needed to be productive, which largely becomes useless once the relationship is terminated (John and Weitz, 1988).

2.5.1.1 Human asset specificity

Human specific assets differ from tangible specific assets because they present additional management challenges[14] included in the notion of behavioural uncertainty[15] (Coff, 1997). Williamson describes transactions involving human capital investments that are transaction specific as being characterised by "skills acquired in a learning-by-doing fashion and imperfectly transferable across employers which need to be embedded in a protective governance structure, lest productive values are sacrificed if the employment relation is unwittingly served" (Williamson, 1981a, p. 563). Coff (1997, pp. 375, 377) describes human asset specificity as "special skills, knowledge, or personal relationships only applicable in a given firm" and "human capital under limited organisational control having the potential to generate economic rent". As a result, these investments are not transferrable to alternative uses at no or low cost and hence the benefits can only be realised as long as the relationship is maintained.

Skills associated with human asset specificity are in contrast to the generic technical and professional skills of engineers, doctors, lawyers and accountants. Skills held by these professionals are valuable in a variety of companies or industries (Coff, 1997; Williamson, 1981a). It is only when these generic skills are deepened and specialised to a particular employer that both parties have an interest in maintaining the relationship. If they are not, the employer can easily employ a substitute and the employee can easily move to alternative employment (Williamson, 1981a). Williamson (1981a), further emphasises work experience is not sufficient to constitute high human

[14] Coff (1997, pp374) illustrates this point by contrasting human assets with physical assets (oil field) from four perspectives: 1. Cannot resign and move to competing firm; 2. Demand higher or more equitable wages; 3. Reject the firms' authority or be unmotivated; 4. Need not be satisfied with supervision, co-workers or advancement opportunities".

[15] Behavioural uncertainty is a separate transactional dimension discussed later in this section.

asset specificity. He illustrates this by contrasting typing skills, enhanced by practice but equally valuable to any employer (not asset specific) with the knowledge and experience of a company's unique filing system which is highly asset specific as it is of little use to another company. Thus, low human asset specificity imposes less emphasis on the choice of outsourcing or providing services internally.

2.5.1.2 Human asset specificity – literature review

A large body of literature examines the concept of human asset specificity in a variety of organisational settings. Lohtia, Brooks, and Krapfel, (1994), in an examination of TCE literature, observes human asset specificity has received the most attention of the asset specificity constructs. In a more recent review Macher and Richman (2008) concur suggesting this is due to the significant cost of human capital and because there are a wide variety of measurement approaches for the construct. The following discussion of the impact of human asset specificity on governance choice proceeds in approximate chronological order.

Monteverde and Teece (1982), in a study of the U.S automobile industry, examine why General Motors and Ford took some development activities, described as specialised, non-patentable know-how, in house. The researchers, using the required engineering effort for a variety of different components as a proxy for the degree of asset specificity, find a significant positive association with the level of vertical integration as predicted by TCE. Anderson and Coughlan (1987), Anderson and Schmittlein (1984) and John and Weitz (1988) find support for human asset specificity as an explanatory factor in the choice of using a direct sales force (employees) versus indirect (outside agents). Results provide evidence of the propensity to maintain the function in house rising concurrently with the importance of company specific factors such as knowledge of formal and informal operating procedures, relationships with customers, relationships within the company and technical expertise. Klein et al., (1990) use TCE to explain the extent of forward integration within distribution channels in international markets. They find evidence in support of TCE that the asset specificity of the specialised knowledge required is a significant positive factor in determining whether the marketing function is internalised or outsourced.

Aubert et al., (1996b), in their study of outsourcing in the Information Technology industry, find support for human asset specificity as a significant determinant for sourcing information technology requirements. The authors conducted in depth interviews with ten large organisations outsourcing all or part of their information technology requirements and found routine maintenance of personal computers, characterised by low asset specificity, was generally outsourced. In contrast, software development activities requiring a greater degree of company specific knowledge were more likely to be maintained in house.

The authors extend their argument in a later study (Aubert et al., 2003) by using the 'theory of costly contracts' proposed by Grossman and Hart (1986)[16]. They propose that business skills and technical skills are required to carry out any given activity. Business skills are defined as knowledge of the company's business environment (company specific knowledge) and technical skills as the generic components of a given activity. Tasks requiring a high level of business skills (high asset specificity) should be kept in house as employees master this content more easily. Tasks with a high component of technical skills should be outsourced to suppliers who can foster them more effectively. Aubert et al., (2003) de-couple business and technical skills from the construct asset specificity and measure them as separate dimensions. Using a two stage process of an initial survey followed by a follow up survey and ranking exercise, they find evidence that companies tend to outsource their information technology requirements to external suppliers when important technical skills are involved. This is in contrast to operation scheduling, a complex highly company specific task requiring an understanding of the nature of the business information being processed which is almost exclusively conducted in house supporting the Grossman and Hart (1986) proposition.

However, results for the separate construct 'asset specificity' were conflicting. The initial survey found a positive association between outsourcing information technology and the presence of human specific assets in contradiction to the theory. In contrast, the subsequent follow up and ranking exercise provided opposite results in

[16] Grossman and Hart (1986) acknowledge their theory of costly contracts is building on foundations laid by Ronald Coase (1937), Klein et al., (1978) and Williamson (1979).

support of TCE. Aubert et al., (2003) suggest this could be due to a number of confounding factors unrelated to specific knowledge. Anecdotal evidence suggests at the time of the study there was a shortage of qualified experts, which lead to delays in employing and training employees making outsourcing the best option regardless of the asset specificity of the activity. Other studies finding conflicting results for asset specificity as a factor in determining governance choice include Nam, Rajagopalan, Rao, and Chaudhury (1996), who explore the determinants of the outsourcing decision for information technology and find no significant relation. Murray and Kotabe (1999) examine the sourcing of services by U.S. companies on a global basis and results indicate a positive relationship between asset specificity and outsourcing, the opposite direction predicted by TCE.

There are limited studies examining human asset specificity in a corporate governance context. Kent (2011) applies TCE to explain the decision to outsource management advisory services. Two studies using TCE as a theoretical framework to investigate why companies outsource internal audit are of more relevance to this thesis. Widener and Selto (1999) and Speklé et al., (2007) in their replication of the Widener and Selto study, find that companies internalising their internal audit activities reported significantly higher levels of asset specificity.

Recall that risk management activities are those undertaken by ASX listed companies to fulfil their statutory duty to develop, implement, oversee and report on an effective system of risk management. TCE predicts that the asset specificity of risk management activities rises as the skills and knowledge of the human specific assets undertaking these activities is deepened to encompass 'company specific' characteristics not transferrable to other companies. Hence, the risk management activity can be generic and standardised. For example, conducting an internal audit or financial review of the accounting skills required to provide support for recognising and managing the risks associated with financial reporting can be routine compliance work. However, the knowledge and skills required to effectively carry out the activity varies from company to company and the asset specificity of these skills depends on the degree of company specialised knowledge required. This is influenced by the extent that the company's systems, policies and procedures are customised to suit the company's

unique requirements. It is expected that greater transaction specificity of human assets required to undertake the risk management function is associated with more internal generation of risk management. This leads to hypothesis one:

H1: Companies with more transaction-specific human assets outsource less risk management activities than those with less transaction-specific human assets.

2.5.2 Uncertainty

The second key dimension of a transaction increasing transaction costs is the uncertainty associated with the underlying transaction and the economic exchange partners involved. Williamson (1979) argues uncertainty is the second most prominent cause of increasing transaction costs. Uncertainty arises when the relevant contingencies surrounding the exchange are too unpredictable or numerous to specify ex ante in a contract, or performance ex post cannot be easily verified (Geyskens et al., 2006). This is a result of bounded rationality, that is, the inability to foresee all potential eventualities and opportunism where parties may exhibit self interested behaviours to the detriment of the company. The transaction costs associated with the exchange increase as uncertainty rises. It is then a question of which governance mechanism of internal production or outsourcing is the least costly.

Aubert et al., (1996b) cite uncertainty as the origin of all market failures and the most prominent and intuitive contributor to transaction costs. Researchers distinguish between environmental uncertainty and behavioural uncertainty (Anderson, 1985, 1988; Anderson and Schmittlein, 1984; Gatignon and Anderson, 1988; John and Weitz, 1988; Kent, 2011; Speklé et al., 2007; Widener and Selto, 1999).

2.5.2.1 Environmental uncertainty

Noordewier, John and Nevin (1990) define environmental uncertainty as ‘unanticipated changes in circumstances surrounding an exchange’. Environmental uncertainty precludes the ability to write and enforce complete contracts (Klein et al., 1990). This is because bounded rationality limits the ability to specify every possible contingency in an environment characterised by uncertainty (Klein, 1989). Hence, the resulting information asymmetry provides the potential for trading partners to behave

opportunistically (Klein et al., 1990). Since a comprehensive contract cannot be written, the costs of ongoing renegotiations are incurred (Rindfleisch and Heide, 1997).

Researchers have explored the concept of environmental uncertainty within the TCE framework resulting in a number of conceptual abstracts. Walker and Weber (1984) extend Williamson's basic framework and distinguish between two types of environmental uncertainty and these are volume and technological uncertainty. Volume uncertainty refers to the inability to accurately forecast demand requirements and therefore buyers and sellers face either excess or insufficient capacity. Technological uncertainty refers to the unpredictable changes in technical requirements such as standards, component specification and other technological developments (Walker and Weber, 1984). Klein et al., (1990)[17] divide environmental uncertainty into two concepts, volatility and diversity of the environment which predict opposite governance modes. Volatility is the extent the environment is changing, with more rapid environmental changes harder to adapt to and to predict future outcomes. Diversity of the environment reflects the heterogeneous nature of a company's operations.

This study deconstructs environmental uncertainty into the three broad constructs of volume/demand, technological and diversity, and these are described as follows (Klein et al., 1990; Walker and Weber, 1984).

2.5.2.2 Environmental uncertainty – volume/demand

Walker and Weber (1984, p. 376) describe volume/demand uncertainty as being dependent on the assessment of fluctuations in demand and the confidence placed in estimates of demand. This creates problems in writing contracts which are inevitably incomplete in some important respects. Under these circumstances, external suppliers exhibit opportunistic behaviour that is likely to have an adverse impact on transactions. It is proposed that this is managed more efficiently through internal production as employees are more flexible than external contractors. Therefore, higher uncertainty due to assessment of volume/demand requirements is associated with relatively higher

[17] Klein, Frazier and Roth (1990) acknowledge these two dimensions correspond to those used to examine the decision making process by Leblebici, Huseyin and Saiancik, Gerald (1981), "Effects of Environmental Uncertainty on Information and Decision Processes in Banks," *Administrative Science Quarterly*, 26, 578-596.

transaction costs in the market, leading to increased internalisation relative to outsourcing requirements (Klein et al., 1990).

Aubert et al., (2003) refer to demand uncertainty in the context of outsourcing information technology requirements. Demand uncertainty occurs when both parties in an exchange do not know ex ante the exact quantity or nature of the deliverable product, or the form of the service required. This makes it difficult to write a contract with an external party as it could open the company up to opportunism on the part of the supplier. This can be mitigated in house by using employees so the employer can adapt or change specifications of outputs as required (Aubert et al., 2003). Results from their study (Aubert et al., 2003) support this proposition, finding companies outsource more readily those activities associated with low demand uncertainty. John and Weitz (1988) propose that a governance structure supporting sequential, adaptive decision making is required when uncertainty exists in predicting sales, volatility of market share and industry volumes and there is a degree of difficulty in monitoring trends. Their results support this proposition with evidence of a positive relation between the proportion of sales made through a company's direct channel (in-house) and this measure of environmental uncertainty (John and Weitz, 1988). Artz and Brush (2000) find evidence that environmental uncertainty due to price, demand and volume volatility increase the cost of outsourcing for original equipment manufacturers.

Widener and Selto (1999) define environmental uncertainty as the expected variation in the demand for internal audit activities because of business conditions and the adaptations required by companies due to the volatility of the business environment. The construct is measured as variation in business needs, changes in the organisation, predictability of internal audit requirements and staff turnover. Finding no support for this dimension, the authors conclude their measure was noisy and lacked reliability advocating that future research strive for more reliable measures. Speklé et al., (2007) propose environmental uncertainty does not affect internal audit sourcing decisions and their results validate the original Widener and Selto (1999) study.

2.5.2.3 Environmental uncertainty – technological

There is limited contemporary research within the TCE literature on the impact of technological change as a dimension of environmental uncertainty. Early researchers examining technology as a factor impacting governance choice include Gordon and Narayanan (1984), who measure the perceived stability versus dynamic nature of technology as one aspect of environmental uncertainty impacting organisational structure. Walker and Weber (1984) define uncertainty in terms of technological change. The costs of managing and coordinating activities between internal demands and external suppliers increase more than coordinating activities internally, making vertical integration the least costly option as the frequency of technological change increases.

The relation between environmental uncertainty induced by technological change, technical skills and human asset specificity is examined in Afuah (2001). Some skills and knowledge are rendered obsolete as competencies are destroyed in the presence of rapid technological change (Afuah, 2001). Afuah (2001) proposes that vertical integration provides a more durable base from which adaption to technological change is made because tacit[18] knowledge is difficult to transfer; therefore, outsourcing incurs higher transaction costs as predicted by TCE and knowledge based theory. Afuah (2001) argues this is due to the frequent interaction required to support new knowledge acquisition and exploitation necessitated by technological advancements.

The above discussions lead to hypothesis 2a:

H2a: Companies with higher volume/demand and technological uncertainty outsource less risk management activities than those with lower volume/demand and technological uncertainty.

2.5.2.4 Environmental uncertainty - diversity

Recall that diversity of the environment reflects the extent to which there are multiple sources of uncertainty in the environment, due to the heterogeneous nature of a

[18] Tacit knowledge is personal knowledge that is non-verbalised and often embedded in an organisation's routines. Described as the skills and craftsmanship deeply embedded by an organisation that could only be passed on with great difficulty (Polanyi, 1961) and specialised code words or expressions that can and do arise in the context of recurring transactions that yield economies (Polanyi, 1962).

company's operations. Companies with more diverse heterogeneous environments such as many competitors, diverse customer base, subsidiaries and international operations require a greater quantity of complex information. This is likely to lead to a preference for flexible information flow, which can be obtained more cost effectively from external suppliers leading to less integration of the risk management function. Kent (2011), in her Australian study, proposes the number of controlled entities and the number of geographical segments are indicators of environmental diversity. Results provide evidence of a positive relation with the outsourcing of management advisory services and these characteristics (Kent, 2011). This study measures four aspects of uncertainty due to environmental diversity and these are operational complexity, competition, structural change and variation in business needs.

In contrast to uncertainty due to volume/demand and technology, it is proposed that environmental diversity is managed more efficiently through outsourcing risk management activities to external suppliers. This leads to hypothesis 2b:

H2b: Companies with higher uncertainty relating to or associated with environmental diversity outsource more risk management activities than companies with less diverse environments.

2.5.2.5 Behavioural uncertainty

Koopmans (1957) attributes behavioural uncertainty to the lack of knowledge about the actions or decision rules of other economic actors. Behavioural uncertainty arises from human action and refers to the effects of opportunism on transactions (1985). The costs of opportunism increase when the output is not easily observable or verifiable.

Behavioural uncertainty is associated with the evaluation of individual productivity and performance of human assets or adherence to a contract (Alchian and Demsetz, 1972; Williamson, 1981a, 1985). It is uncertainty that is attributable to opportunism exhibited through non-disclosure, disguise or distortion of information (Alchian and Demsetz, 1972; Williamson, 1981a, 1985). An example is making false claims about executing an activity and then accepting the remuneration for the false claim (John and Weitz, 1988). This is especially relevant for activities undertaken in the

service sector as the elements of an exchange are particularly difficult to evaluate (Aubert et al., 1996b) in comparison to the production process of goods.

Williamson (1985) identifies a number of issues associated with the evaluation of individual performance. There is the possible difficulty in recording an individual's results accurately. This is magnified if individual effort or each person's marginal productivity is inseparable from the team effort when the production of a good or service is carried out by teams (Alchian and Demsetz, 1972). Williamson, Wachter, and Harris (1975) argue that it is not the inseparability issue alone that is problematic. It is only when combined with opportunism and information impactedness[19], as a result of bounded rationality and uncertainty, that performance evaluation becomes difficult. There are the transaction costs of supervision as managers are required to oversee and make judgments about the output of individuals (Anderson and Schmittlein, 1984). Finally, performance may not be a simple measurable output. Hence, as a result of these measurement issues companies attempt to minimise performance evaluation costs associated with monitoring and measuring the behaviours and output of exchange partners through internal production (Williamson, 1985).

Anderson and Schmittlein (1984) conduct a study of the sales forces of companies in the electronic components manufacturing industry and results confirm the TCE proposition that difficulty in measuring individual performance (behavioural uncertainty) is strongly associated with the use of a direct sales force (internalisation). Aubert et al., (1996b) examine outsourcing of information systems in large Canadian companies. The authors refer to behavioural uncertainty as 'measurement problems' which arise if the two conditions of observability and verifiability of performance are compromised. Results confirm TCE predictions that routine maintenance tasks, which are observable and verifiable, are frequently outsourced whereas software development, where performance is much more difficult to measure, is kept in house.

[19]Williamson et al., (1975, p259) describe information impactedness as "a derivative condition which appears in conjunction with (1) changing economic conditions (uncertainty), (2) the inability of all interested parties to be costlessly appraised of the changes which have occurred (which is a manifestation of bounded rationality) and (3) the inclination of some of the parties opportunistically to withhold or distort information to which they have preferential access".

Wang (2002), investigating the perceived success of outsourcing customised software development, identifies a number of performance measurement issues relevant and applicable to the risk management services sourcing decision. First is the subjective nature of the relative transaction costs resulting in managers miscalculating their effect on governance choice. Although this can be remedied over time as market forces reach equilibrium and correct the mistakes, this process may be slow (Wang, 2002). Second, the difficulty in defining efficiency, which makes comparison between alternative suppliers more complex (Wang, 2002). Results from Wang's study support the proposition that behavioural uncertainty is a decisive factor in determining the perceived success of outsourcing customised software development[20].

Risk management is a function requiring specialist skills and knowledge performed with relative autonomy in the completion of the task. Therefore, there is the possibility that service providers are in a position to shirk on quality and effort (Speklé et al., 2007). Hence the problem of behavioural uncertainty and the associated issues of observability and verifiability are especially relevant. In addition, a great deal of professional judgment is required if the quality and efficiency of the output cannot be easily ascertained (Speklé et al., 2007). Internalising the risk management function allows for better monitoring of performance quality under these circumstances.

Kent (2011), proposes that established management has a relative advantage in the performance evaluation of internal employees, thus reducing behavioural uncertainty. In contrast, new management do not have this relative advantage because they are unfamiliar with their new employees' knowledge, expertise and potential for opportunistic behaviour. This increases relative behavioural uncertainty in evaluating internal employees. Hence, new members entering the organisation, uncertain about the expertise of internal management, seek the advice of independent advisers outside the organisation rather than internal advisers. Kent (2011) finds evidence that a change in management is associated with increased outsourcing of management advisory services.

Given the above arguments, this study expects behavioural uncertainty associated with external suppliers is managed more efficiently through internalisation of

[20] The research model used by Wang (2002) includes contractor reputation and asset specificity and the effects of asset specificity interacting with the other variables.

a company's risk management activities except for newer management who lose the relative advantage in evaluating internal employees. This is leads to hypotheses 3a and 3b:

H3a: Companies with higher behavioural uncertainty relating to external suppliers outsource less risk management activities than those with lower behavioural uncertainty relating to external suppliers.

H3b: Companies with newer management outsource more risk management activities.

2.5.3 Frequency

The third dimension in TCE is frequency, which is the most simple to contextualise because it represents the volume and value of transactions over time (Speklé et al., 2007; Williamson, 1979). A greater volume of transactions leads to internal specialisation and provides greater potential for gaining benefits from economies of scale and thus reduced production costs (Klein, 1989; Klein et al., 1990). Likewise, with increasing frequency of transactions, a company is able to develop their own assembled knowledge facilitating internalisation of the activity and mitigating the requirement to contract with external providers (Kent, 2011). In addition, there is the benefit of holding and utilising management skills and thus maximising the value from expenditure on internal production (Anderson, 1985). However, if the demand for and occurrence of transactions associated with risk management activities is infrequent, the benefit of establishing a dedicated internal risk management function are unlikely to exceed the considerable set up costs and incremental overheads (Anderson and Schmittlein, 1984). Hence, transactions made infrequently are more likely to be outsourced to obtain the help of external providers as companies prefer to bear the costs of potential opportunism and uncertainty rather than the cost of creating and maintaining a dedicated function (Aubert et al., 1996b).

A company's ability to internalise an activity could be a function of the size of the company with larger companies having more capacity to expend the required resources than smaller companies (Erramilli and Rao, 1993). Larger companies are therefore more likely to integrate their risk management function. In support of the

size/governance choice nexus, Heide and John (1988) argue that small companies with specific assets protect their investment by investing in relationships with their external suppliers. Results from a survey of 199 small manufacturing companies support this proposition.

Williamson (1981a) asserts that the frequency dimension is suppressed for human assets involved in a continuing supply of services and attention is focused only on the internal aspects of uncertainty and asset specificity. However, Widener and Selto (1999), Speklé et al., (2007) and Kent (2011) argue that the demand and thus frequency of transactions for internal audit and management advisory services is a relevant factor in determining governance choice. Results from these studies support this proposition, finding a negative relation with the outsourcing of internal audit and management advisory services as predicted by TCE. Based on this premise, it is expected that the governance choice for risk management services is driven by frequency of transactions. This leads to hypothesis 4:

H4: Companies with higher frequency of risk management activities outsource less than those with lower frequency of risk management activities.

2.6 COMPLIMENTARY THEORETICAL FRAMEWORKS

Whilst this study emphasises TCE in explaining the governance choice, it recognises and draws on other theoretical frameworks predicting the boundaries of the company. In particular, elements of TCE overlap with agency theory. TCE and agency theory depict the company as a nexus of contracting relationships[21] incurring transaction costs that the organisation seeks to minimise (Oviatt, 1988). The propensity for opportunistic behaviour is acknowledged in both theoretical frameworks as a key impediment to accomplishing this goal (Oviatt, 1988). The transaction costs identified in TCE of negotiating, monitoring and enforcing contracts are similar to the agency costs of bonding and monitoring. Information asymmetry is identified in the literature as the core driver of these transaction costs (Coff, 2003). Hence, it is acknowledged that the two theories are complementary.

[21] Agency theorists define organizations as "legal fictions which serve as a nexus for a set of contracting relationships among individuals" (Jensen and Meckling, 1976, p. 310).

Resource based theory provides the foundation for a number of theoretical frameworks examining the governance choice with asset specificity as a key component. They include knowledge based, core competencies and dependency approaches. Resource based theories view the company as a unique bundle of assets, some of which can be a source of sustainable competitive advantage (Barney, 1991). Viewing the company from a strategic perspective, a company's competitive advantage lies in identifying and acquiring critical resources (Barney, 1991). These approaches acknowledge asset specificity as closely related to strategic importance (Arnold, 2000) and the specificity of assets as a key determinant of governance choice. The knowledge based approach focuses on the transaction costs associated with transferring knowledge (Grant, 1996) as companies operate with different degrees of 'knowledge intensity' as a key factor of production (Coff, 1999). Coff (1999) describes the management dilemmas associated with knowledge intensity and the associated costs of providing for difficulties in the coordination and transfer of knowledge from specific human assets. He argues these are more relevant in determining the boundaries of the company than opportunism as proposed by TCE (Coff, 2003).

Dependency theory argues that human asset specificity creates inter organisational dependence through the requirement to safeguard human assets which incurs costs[22] (Heide and John, 1988). The core competencies approach that argues those activities considered as core competencies should remain within the company due to their strategic importance regardless of the asset specificity of the activity (Arnold, 2000; Conner and Prahalad, 1996; Prahalad and Hamel, 1990).

2.7 CONTROL VARIABLES

There are other company characteristics likely to influence the sourcing decision for a company's risk management activities. The following discussion, which draws on theoretical propositions and evidence from existing research, provides a theoretical foundation for a number of control variables to be included in the study.

[22] Heide and John (1988) propose that companies will engage in 'bonding behaviours' to create exit barriers and safeguard their specific assets which incur additional transaction costs.

2.7.1 Industry

A company's risk management activities are likely to be related to the industry in which they operate ,and industry regulatory bodies can restrict management's discretion (Christie, Joye, and Watts, 2003). For example, the finance industry is regulated by the Australian Prudential Regulation Authority, which places an additional burden of risk management on its affiliates. This study draws on previous research examining industry affiliation from TCE and resource based theory perspectives given industry membership influences the nature and magnitude of risk management activities.

Demsetz (1988) proposes that knowledge is costly to transfer and these costs increase as asset specificity rises, and are a determining factor in establishing the boundaries of a company. Christie et al., (2003), categorise the fifteen U.S. SIC[23] industries into one of three levels according to the unobservable transaction costs of their 'knowledge transfer'[24] using Demsetz's definition. Inclusion of this variable improves the fit and specification of their model's ability to explain the degree of decentralisation of a company. This study adopts an adaption of the schema developed by (Christie et al., 2003). Each of the sixty-seven GICS[25] industry sub sectors used by the ASX is categorised by knowledge transfer costs as defined by Christie et al., (2003) and each company in the sample under analysis in the study is classed accordingly.

2.7.2 Proprietary information

A company derives its competitive strength from its proprietary assets and is protective about losing these to an alliance partner (Kale, Singh, and Perlmutter, 2000). Therefore, companies with high proprietary knowledge are expected to minimise the use of external consultants in order to reduce the number of outside personnel exposed to their private information. Recognising generally sensitive and proprietary information,

[23] Standard Industrial Classification is a U.S government system for classifying industries by a four-digit code.

[24] Christie et al., (2003) use a combination of survey and archival data to measure whether companies in an industry group tend to generate relatively more specialized or non-specialized knowledge, categorised as 0, 0.5 or 1. The construct 'specialised knowledge' is a composite measure incorporating industry affiliation, growth, size and performance (volatility of the company's rate of return on equity at firm and divisional level).

[25] The Global Industry Classification Standard (GICS) has ten industry sectors containing 67 industry sub-sectors, which are used to categorise companies in the sample.

such as trade secrets and strategic planning, are conducted in house even though outsourcing may result in cost saving this study controls for the magnitude of exposure to proprietary information for risk management personnel (Anderson, 1985; Anderson and Schmittlein, 1984; Brouthers and Brouthers, 2003; Christensen, Kent, and Stewart, 2009; Gatignon and Anderson, 1988; Speklé et al., 2007; Widener and Selto, 1999).

2.7.3 Reputation of external supplier

A large body of accounting and audit research literature exists classifying the largest international accounting companies, known as the Big4[26], as high quality service providers (Beasley et al., 2005). In an empirical study examining enterprise risk management in U.S. and international organisations, Beasley et al., (2005) find that companies with a Big4 auditor are more advanced in their implementation of enterprise risk management. Wang (2002) finds evidence that the reputation of an external supplier has the ability to limit perceived post contractual opportunism and enhance perceived quality of performance for information systems outsourcing. Given these arguments, companies are more likely to outsource to external suppliers with a reputation for quality, regardless of other factors. Hence, this study identifies whether the company has a Big4 accounting company providing any external audit and/or risk management services. It is proposed that companies with a Big4 auditor outsource to the Big4 more risk management activities than those with an auditor who is a non Big4 accounting company.

2.7.4 Capital intensity

Erramilli and Rao (1993) argue capital intensity represents the magnitude of a company's investment in fixed assets which varies across and within industry groups, and is a moderating variable in the choice of governance decision. Increasing capital intensity signifies rising resource commitments; the cost of which make it harder for companies to establish functions internally regardless of other company specific factors such as the degree of asset specificity. Therefore, as capital intensity increases,

[26] The four accounting firms are Deloitte and Touche, Ernst & Young , KPMG and PriceWaterhouse Coopers

companies are more likely to seek external suppliers for their risk management requirements rather than maintain a function in house.

2.7.5 Growth and financial distress

Abbott, Parker, Peters and Rama (2007) find evidence that fast growing companies and companies more likely to experience financial distress are more likely to outsource internal audit. Kent (2011) provides evidence that short-term growth restrains internal production of management advisory services as it is positively associated with outsourcing to external suppliers. On this basis, this study controls for growth in total assets in the previous three years (Abbott et al., 2007; Kent, 2011) and financial distress measured by two net losses in the previous three year period (Abbott et al., 2007) as factors that have the potential to restrain internalisation of the risk management function.

2.7.6 Leverage

Implicit in the decision to internalise or outsource production of any good or service is the assumption the company has the resources available to make this choice (Kent, 2011). High debt levels could reduce the financial resources available and preclude a company from contracting for risk management activities from any suppliers. Thus, leverage is measured as a control variable in this study.

2.7.7 Other reasons for internalising and/or outsourcing risk management activities

Recall that this research acknowledges there is a significant body of literature applying other theoretical frameworks predicting the boundaries of the company. A number of studies explore outsourcing from alternative perspectives: identifying advantages and disadvantages, some complementary and others contradictory to the theoretical propositions of TCE. Therefore, as a supplementary analysis, this study draws on prior research to more comprehensively explore alternative explanations for internalising and outsourcing risk management activities.

Quinn and Hilmer (1994) emphasise the strategic importance of maintaining core competencies in house and outsourcing other activities. Internalising core functions

maintains control, ensures flexibility and mitigates the risk of sub-optimal service by avoiding the requirement to manage relationships with external parties (Beaumont and Sohal, 2004; Gilley and Rasheed, 2000b; Lonsdale, 1999; Lonsdale and Cox, 2000; Quinn and Hilmer, 1994; Raiborn, Butler, and Massoud, 2009; Selim and Yiannakas, 2000; Serafini, Sumners, Apostolou, and Lafleur, 2003).

Lonsdale (1999) and Lonsdale and Cox (2000) explore the history of outsourcing, combining TCE and resource based theory to develop a risk model of outsourcing from a strategic and operational perspective. Arnold (2000) combines TCE with core competencies theory as complementary approach to modelling the outsourcing decision. He proposes that asset specificity is closely related to strategic importance and is therefore more likely to be internalised. His outsourcing model incorporates outsourcing strategic activities not considered as core competencies.

Gilley and Rasheed (2000b) apply competency based and resource based theories in a study of U.S. manufacturing companies. They identify strategic importance as a reason to internalise, and risk sharing and concentration on core competencies as a motivation to outsource.

Kakabadse and Kakabadse (2002) conduct interviews and a follow up survey to identify the key reasons for companies to outsource activities in the U.S. and Europe. Shared objectives are achieving best practice, ability to focus on core competencies and access to expertise with European companies placing greater emphasis than U.S. companies on achieving economies of scale. Beaumont and Sohal (2004) survey one hundred and sixty two CEOs of Australian companies in 2002 seeking information on the nature and intensity of their outsourced activities. The study identified advantages to outsourcing, which included the ability to concentrate on core activities, share risks with external suppliers and accommodate variable demand requirements. These advantages are also identified as motivation to outsource the internal audit function (Caplan and Kirschenheiter, 2000; Selim and Yiannakas, 2000). Abbott et al., (2007) find evidence that companies are more likely to outsource routine internal audit activities. However, in a survey of the U.K. public and private sectors, Selim and Yiannakas (2000) find organisations are less inclined to outsource internal audit than other services. Considered a ‘core’ and ‘essential’ activity, the main motivating factor behind

outsourcing internal audit is access to specialist skills. Serafini, Sumners, Apostolou and Lafleur (2003) survey and interview a number of chief audit executives in the U.S. concerning their attitudes to external providers of internal audit services. Benefits identified include access to knowledge and expertise, achieving best practice and flexibility.

Raiborn et al., (2009) examine issues associated with the outsourcing of internal support functions, identifying loss of control and innovation as key risks. Investigating the relationship between strategic human capital and the design of management control systems, Widener (2004) draws on TCE and contingency theory. Recognising that human capital is not necessarily company specific, her study identifies the routine nature of an activity as a consideration in the choice of governance structure.

Other studies examining reasons to outsource include Lankford and Parsa (1999), who explore the effective management of outsourcing relationships, and Quélin and Duhamel (2003), who study the motivations and risks of outsourcing in a sample of large European manufacturing companies.

Given the above, this study identifies strategic importance, difficulty in managing external relationships with external suppliers, risk of sub-optimal service, non standard nature of tasks, loss of flexibility and economies of scale as possible alternative reasons to internalise risk management activities. Access to expertise, concentration on core competencies, risk sharing, variable demand requirements, achieving best practice and routine nature of activity are possible reasons to outsource risk management activities.

2.8 CHAPTER SUMMARY

This chapter has provided the theoretical foundation upon which this study is built. TCE has been used to provide a basis for explaining the choice of governance mechanism for the risk management activities of ASX listed companies. Research hypotheses have been developed describing the association between the TCE dimensions of asset specificity, uncertainty, and frequency and the decision to internalise or outsource transactions for risk management activities.

Under TCE, risk management transactions characterised by no requirement for specialised investment (trivial asset specificity) and/or ease of performance measurement (low behavioural uncertainty) and/or a predictable environment (low demand/volume and low technological uncertainty) and/or a diverse environment and/or infrequent transactions outsourcing is the preferred mode of governance as transaction costs are negligible. Any deviations and transaction costs increase and the market ceases to be the less costly option. The research hypotheses are tested using the research methodology discussed in Chapter 3.

This study acknowledges agency theory and resource based theories are complementary theoretical frameworks that can be applied to the governance choice decision for a company's risk management activities. In addition, this chapter identifies and discusses industry affiliation, exposure to proprietary information, reputation of external supplier, capital intensity, growth, financial distress and leverage as factors likely to influence the sourcing decision for a company's risk management activities.

CHAPTER 3
RESEARCH METHODOLOGY

3.1 INTRODUCTION

As stated in chapter 1, the boards and senior management of companies listed on the Australian Stock Exchange have statutory obligations with respect to risk management. This study uses the theoretical framework of transaction cost economics (TCE) to identify factors that determine how companies resource their risk management function. TCE views the company as a governance structure based on a series of contractual agreements (Alchian and Woodward, 1988), which seeks to minimise transaction costs, and argues that the company will either internalise or outsource in the market depending on the relative transaction costs (Williamson, 1979).

Williamson (1979) proposes that transactions can be characterised by the three broad principal dimensions of asset specificity, uncertainty and frequency. Chapter 2 discusses these dimensions as company specific factors impacting the sourcing decision for risk management activities. A number of hypotheses are developed and presented based on the predictions of TCE. This chapter describes the research methodology used to measure each of the hypothesised variables for operationalisation in the statistical analysis and proceeds in the following manner.

Section 3.2 provides an overview of the methodology used for development of the research instrument, a survey questionnaire and archival measures. A summary of the variables employed in the statistical modelling to predict the governance choice for risk management activities for ASX listed companies is also presented. Section 3.3 discusses the development of measures for the dependent variable, governance mode and the independent variables for the three key TCE dimensions of asset specificity, uncertainty and frequency. Measurement of control variables is also discussed. Section 3.4 summarises the chapter.

3.2 OVERVIEW OF THE RESEARCH METHODOLOGY

'Theory provides the foundation for all scientific research' (Flynn, Sakakibara, Schroeder, Bates, and Flynn, 1990, p. 253). This study applies the theory of TCE to

determine what factors impact the decision to internally generate or outsource risk management activities using empirical research methodology. Empirical research uses knowledge based on real world observations (Flynn et al., 1990) to test hypotheses. This study operationalises the hypotheses developed in Chapter 2 using empirical data obtained from two sources; a survey instrument and archival data from company annual reports. A combination of data collection methods is useful to triangulate research evidence (Flynn et al., 1990).

The first stage is construction of the measures for operationalisation. That is, item and scale generation and development. Assuring accuracy of measurement of the constructs under examination is a critical consideration when constructing questionnaire items (Barrett, 1972). The ability to successfully observe a covariance between variables is dependent upon the ability to accurately and reliably operationalise the constructs of interest (Hinkin, 1995). An extensive cross disciplinary review of governance choice studies is conducted. Empirical studies that have employed survey questionnaires, interviews and supplementary archival data are used as the basis for development of this study's research instrument and provide guidance in the measurement of the qualitative and quantitative aspects of a company's risk management function. Two governance studies on internal audit in the management accounting literature (Speklé et al., 2007; Widener and Selto, 1999) published questionnaire items. However, much of the empirical analysis in the TCE field has been conducted in the fields of marketing and information systems due to these disciplines' traditions of using surveys to measure and operationalise constructs which can be readily applied to TCE (Rindfleisch and Heide, 1997). As a result this study's research instrument relies heavily on modifying items developed for measuring constructs from these disciplines (Anderson, 1985, 1988; Anderson and Coughlan, 1987; Anderson and Gatignon, 1986; Anderson and Schmittlein, 1984; Aubert, Rivard, and Patry, 1996a; Aubert et al., 1996b, 2003; Klein, 1989; Klein et al., 1990).

Geyskens et al., (2006) review 200 empirical TCE studies noting that survey and proxy measures were frequently limited by a single item. Herche and Engelland (1996) note the importance of using multi item measurement methodology for constructs which

are not directly observable and complex in their interpretation, and this study seeks to measure the TCE constructs by multiple item measures where possible.

A survey questionnaire is developed in accordance with the objectives of the research. Items in the questionnaire consist of questions and statements designed to capture the relevant domain of interest, which is a company's risk management activities, by focusing on factual matters and perceptual viewpoints (Leung et al., 2003). The aim is to capture quantitative data for operationalising in the statistical models and qualitative data to enhance descriptive analysis and provide a comprehensive overview of the risk management activities for ASX listed companies.

Table 3.1 below summarises the variables, measures, applicable questionnaire references (or archival data) developed for the statistical analysis. The questionnaire sent to respondents is presented in Appendices A-1 and A-2.

Table 3.1 - Summary of variables, measures and data sources developed for statistical regression analysis.

Variable	Measure	Questionnaire item number
Governance: dependent variables *three dependent variables*	• Categories of risk covered by company's risk management system (for descriptive purposes). • Governance choice & proportion of a company's risk management activities outsourced if applicable. • Nature of external supplier (for descriptive purposes and as control variable). • Number of staff working in risk management (measure of insourcing).	• 1 • 2 and 3 • 4 • 23
Asset Specificity: *five independent variables*	• Company specific knowledge and training. • Contract characteristics. • Staff turnover. • Education (*not used in hypothesis testing*). • Expenditure on research and development.	• 6, 7, 8, 9, 11 and 13 • 5 and 12 • 14 and 15 • 23(b) • Archival data
Environmental Uncertainty – volume/demand and technological *three independent variables*	• Volume/demand uncertainty. • Volume/demand (environmental dynamism). • Technological uncertainty.	• Archival proxy • 18 • 19
Environmental Uncertainty – Diversity: *five independent variables*	• Diversity of internal operating environment. • Environmental diversity through competition. • Heterogeneous nature of company's activities. • Uncertainty associated with recent restructure, merger or acquisition.	• 17 • Archival proxy • 2 archival proxies • Archival data
Behavioural Uncertainty: *three independent variables*	• Degree of difficulty perceived in evaluating individual productivity and performance of external suppliers of risk management services. • Degree of perceived difficulty in evaluating quality of external suppliers of risk management services. • New management.	• 10 • 16 • Archival data
Frequency: *one composite independent variable*	• Company size. • Volume of transactions of risk management projects undertaken and magnitude of direct expenditure on risk management activities (not used in hypothesis testing).	• 3 archival proxies • 21 & 22
Control Variables: *seven independent variables*	• Industry. • Exposure to proprietary information. • Reputation of supplier. • Capital intensity. • Growth and financial distress. • Leverage.	• Archival proxy • 20 • 4 and archival data • Archival data • 2 archival proxies • Archival data

3.3 DEVELOPMENT OF MODEL VARIABLES – STAGE 1

Prior to commencement of the questionnaire development process a panel of academic experts consisting of six professors from accounting, management, economics and marketing were assembled. The panel members, with extensive experience in TCE, corporate governance and survey questionnaire design agreed to review and provide

feedback at each stage of the survey development process. This is an integral part of questionnaire development and assists in ensuring validity and reliability which typically results in a requirement for revision at each stage (Flynn et al., 1990). The instrument is reviewed and feedback provided three times, twice prior to pilot testing with three Chief Financial Officers and finally before submission to the university ethics committee. Each review resulted in the deletion and modification of questionnaire items and rating scales and refinement of design and formatting. The final questionnaire consisted of 25 items and is presented in Appendices A-1 and A-2.

3.3.1 Item generation and scale development

The first stage in the survey questionnaire development process is item generation where the primary concern is content validity to ensure adequate capture of the domain of interest without extraneous content (Hinkin, 1995, 1998). An extensive cross disciplinary review of governance choice studies is conducted. A number of publications provide questionnaire items and are used as the basis for development of the questionnaire.

Items in the survey questionnaire contain questions and statements designed to identify the theoretical constructs being measured. Scales are used to distinguish the differences in survey respondents in the variables of interest measured by the questionnaire items (Sekaran, 2003). Reliable scale design is essential for achieving satisfactory valid research conclusions (Krosnick and Berent 1994). This study, relying on prior research to provide guidance, employs a number of rating scales to obtain nominal, ordinal, interval and ratio data. A summary of the measurement, rating scale used and type of data obtained for each of the 25 items in the survey questionnaire instrument is presented in table 3.2 at the end of this section.

Nominal and dichotomous scales assign observations to categories and are used to collect nominal data on the nature, extent and source of a company's risk management activities for operationalisation in the statistical analysis (*items 1, 2, 4, 6, 24, 25*). Ratio scales have the advantage of absolute zero as the point of origin and can therefore measure the magnitude and proportions of differences (Flynn et al., 1990). In addition, the mathematical properties of ratio data increases the number of analytical

techniques available for data analysis (Flynn et al., 1990; Sekaran, 2003). This study uses ratio scales to collect interval data on the proportion of risk management activities outsourced and the average contract length for external suppliers of risk management activities *(items 3, 5)*. In addition actual values are collected for a number of items, *(items 13, 14, 21, 22, 23)* providing ratio data for training, staff turnover and transaction volume relating to risk management activities.

Likert[27] scales are interval scales designed to determine the relative intensity respondents feel towards a particular concept (Babbie, 1998). Respondents are asked to rate according to an interval scale of categories varying in intensity, for example, from strongly disagree to strongly agree and very difficult to very easy. It is important for a scale to contain enough categories in the measure to generate sufficient variance among respondents (Hinkin, 1998). Some researchers (Jacoby and Mattel, 1971) indicate that two or three categories are sufficient to ensure sufficient reliability, which levels off after five (Lissitz and Green, 1975). More recent studies have found that more than three are needed for stability and a rating scale of less than five should be discouraged (Weng, 2004). This study assigns five and six point Likert scales respectively *(items 7, 8, 9, 10, 11, 12 and 15, 16, 17, 18 19)* consistent with prior literature. Table 3.2 at the end of this section summarises the measurement, rating scale used and type of data obtained for each of the 25 items in the survey questionnaire instrument.

An initial questionnaire master containing 433 items and their measurement scales from 27 individual surveys used by researchers to operationalise constructs from TCE and other theoretical frameworks is assembled. Each item and corresponding scale is examined for suitability and adaption to this study's research context. Duplicate items, questions that are very similar and those clearly conceptually inconsistent or irrelevant in the context of risk management are deleted. This results in 54 items and corresponding scales from existing studies used as a basis for questionnaire item development for this study.

[27] Likert first introduced the summative (may or added or subtracted) rating scale in 1932 and they have been widely used ever since amongst social science researchers for the assessment of participants' responses and attributes (Weng 2004).

Hinkin (1995, 1998) advises the development of twice as many as required as only half are likely to be retained. The 54 questionnaire master items and scales are modified to address the research question and gather quantitative and qualitative data on the nature, extent and source of risk management activities. Items consisting of questions and statements are adapted within the parameters of established survey question guidelines (Babbie, 1998; Dillman, 1978, 1991; Sekaran, 2003). Each item addresses a single issue and statements are designed to minimise question bias through proper wording including the use of unambiguous and concise language familiar to target respondents.

The first expert panel review is conducted at this stage. Content validity is assessed to ensure the existence of a clear link between the questions and the theoretical grounding. This results in a number of items being deleted, modifications made and measurement scales refined. The questionnaire is reviewed and feedback provided twice more by the expert panel prior to pilot testing. The final questionnaire consists of 25 items (see Appendices A-1 and A-2).

Statistical regression is used to analyse data to test hypotheses developed by applying the theory of TCE to the risk management sourcing decision. Regression is a statistical modelling technique frequently used in the social sciences (Babbie, 1998) to examine the relationship between a criterion variable (dependent variable) and predictor variables (independent variables) (Sekaran, 2003). The research goal is the explanation of the variability of the dependent variable and its prediction through the influence of the independent variables in the model (Sekaran, 2003). The following sections discuss the development of the measures for the dependent variables, governance mode and the independent variables for the TCE constructs, asset specificity, uncertainty, frequency. A number of control variables are also measured.

Table 3.2 - Summary of questionnaire item rating scales and data type

Questionnaire Item No.	Measurement	Rating Scale	Data Type
1	Identification of risk categories covered under company's risk management system.	Category	Nominal
1	Governance mode – outsourced yes or no.	Dichotomous	Nominal
1	Identified as top 3 priorities.	Category	Ordinal
2	Governance mode – all internal, all external or combination of both.	Category	Nominal
3	Estimated % outsourced: 0-10%; 11-25%; 26-49%; 50-74%; 75-90%; 91-100%	Category	Ratio
4	Nature of external supplier: External auditor, Big4 Accountant, Non-Big4 Firm, Other professional provider.	Category	Nominal
5	Contract characteristics of external supplier from less than yr; 1-3 yrs or more than 3years.	Category	Ratio
6	Training provision to external consultants yes or no.	Dichotomous	Nominal
7,8,9,10,11,12	Company specific knowledge and training, contract characteristics, staff turnover and education: Strongly Disagree to Strongly Agree.	Likert (6pt):	Interval
13,14	Company specific training and staff turnover.	Actual Value	Ratio
15	Staff turnover: Much Lower to Much Higher.	Likert Scale (5pt)	Interval
16	Service quality evaluation: Very Difficult to Very Easy.	Likert Scale (5pt)	Interval
17	Diversity of internal operating environment: (no modification - completely modified.)	Likert Scale (5pt)	Interval
18,19	Environmental dynamism and technological uncertainty: Changing very slowly to Changing very rapidly.	Likert Scale (5pt)	Interval
20	Exposure to proprietary information: 0%, less than 50%; more than 50%; uncertain.	Category	Interval
21,22,23	Volume of transactions in number of projects, expenditure, staff numbers.	Actual Value	Ratio
24,25	Six reasons to internalise/outsource risk management.	Category	Nominal

3.3.2 Governance mode

Prior studies have frequently modelled the dependent variable, governance mode, as a binary variable - internalise or outsource. Fewer studies have modelled the dependent variable using the proportion of outsourced activities. David and Han (2004)

conducted a meta analytical study of empirical research in TCE examining 238 statistical tests from 63 relevant papers and of these 82 per cent were binary. This study models the dependent variable, the choice to outsource risk management activities, as a binary decision (yes/no and high/low) and as the proportion of total risk management activities outsourced.

The first part of the survey questionnaire (items one to four) is designed to capture specific information on the nature of risk management activities outsourced, the proportion outsourced and, if outsourced, the type of external supplier. Item one on the questionnaire requires respondents to identify which categories of risk (from a list of fourteen[28]) are covered under their company's risk management system for the financial year ending in 2009. In addition to identifying risk categories, respondents were asked to indicate which, if any, of these were outsourced. They were also asked to identify their top three most important categories of risk. Items two and three of the survey questionnaire capture data for the dependent variables, outsourcing risk management activities as a dichotomous measure, yes or no/high or low and as a proportion outsourced. Item four captures data on the external supplier of risk management services from four categories provided: external auditor, Big4 accountant, Non-Big4 and other professional service provider.

Table 3.3 below presents the survey questionnaire items, the measure, the scale and the studies from which the items have been derived or adapted:

[28] Twelve of the fourteen categories are the material business risks described in the ASX Corporate Governance Principles and Recommendations (2007) 'as risks that could have a material impact on a company's business. They can include, but are not limited to: operational, environmental, sustainability, compliance, strategic, ethical conduct, reputation or brand, technological, product or service quality, human capital, financial reporting and market-related risks'. The other two risk categories, safety and climate change were included in a compliance review of the amended governance Principles conducted by the ASX Markets Supervision in 2009.

Table 3.3 - Survey questionnaire items for governance choice

Item	Measure	Scale	Basis
1. Please tick all the categories of risks covered under your company's risk management system for the 2009 financial year, and indicate for those ticked if they are outsourced (all or part) to external consultants yes or no (circle Y/N).	Nature and governance choice for specific risk management activities	14 individual categories of risk management activities	(Abbott et al., 2007; ASX Markets Supervision, 2009; Aubert et al., 1996a; Carey et al., 2006)
2. For the 2009 financial year, which best describes how your company sourced its risk management activities?	Governance choice for risk management activities	Choice of three categories: all internal, all external or combination of both	(Abbott et al., 2007; Aubert et al., 1996a; Parmigiani and Mitchell, 2009)
3. Estimated proportion of risk management activities outsourced:	Proportion of risk management activities outsourced	Choice of six Categories: 0-10%; 11-25%; 26-49%; 50-74%; 75-90%; 91-100%	(Abbott et al., 2007; Anderson and Schmittlein, 1984; Carey et al., 2006; John and Weitz, 1988; Parmigiani and Mitchell, 2009; Speklé et al., 2007; Widener and Selto, 1999)
4. To whom? *(please tick all that apply)* External auditor, Big4 Accountant, Non-Big4 Firm, Other professional provider	Type of external supplier	Choice of four categories of external supplier	(Abbott et al., 2007; Carey et al., 2006)
23. How many full time equivalent staff work in risk management?	Insourcing of risk management activities	Number of staff working in risk management scaled by total number of employees	Developed by researcher[29]

3.3.3 Asset specificity

Asset specificity is frequently measured by collecting original data from the contracting parties through techniques such as survey questionnaires and one to one interviews (Macher and Richman, 2008). A number of research methodologies from the accounting, marketing and organisation disciplines are used as the basis for the development of the survey questionnaire and archival proxies used to measure the level of asset specificity of a company's risk management function. This study uses a combination of survey questionnaire items and archival data from company annual

[29] Item 23 is developed to capture data on the number of employees working in risk management as a measure of the insourcing of risk management activities for robustness testing purposes. However, a large number of respondents reported this data as unavailable, which precluded its use in the analysis.

reports to measure five different aspects of the TCE construct asset specificity. These are: company specific knowledge and training, contractual characteristics, staff turnover, education level and expenditure on research and development.

3.3.3.1 Company specific knowledge and training

Recall that TCE predicts that the asset specificity of risk management activities rises as the skills and knowledge of the individuals undertaking these activities is deepened to encompass 'company specific' characteristics that would not be transferrable to other companies. Williamson (1979, 1981a) describes human asset specificity as transactions involving human capital investments that are transaction specific, characterised by 'specialised training and learning-by-doing'. Hence, the assets associated with risk management activities not transferrable to other companies are the knowledge and skills that are specific to the company.

Table 3.4 below presents the questionnaire items, measurement scales and studies from which they have been derived and/or adapted used to measure the degree of specialised training and 'company specific' specialised knowledge and skills required by risk management staff.

Table 3.4 - Survey questionnaire items measuring degree of specialised training and company specific specialised knowledge and skills

Item	Measure	Scale	Basis
If any risk management activities are outsourced: 6. Does your company provide training to your external consultants to enable them to provide you with risk management services?	Training	Dichotomous Scale (Yes/No)	(Aubert et al., 1996a; De Vita, Tekaya, and Wang, 2009; Heide and John, 1992; Wang, 2002; Zaheer and Venkatraman, 1995)
7. Staff working in a risk management capacity acquire specialised knowledge, skills & abilities that would not be transferable to another company (i.e. 'company specific' skills).	Requirement for company-specific skills	Likert Scale – 6pt (Strongly Disagree to Strongly Agree)	(Anderson, 1988; Ang and Cummings, 1997; Colbert and Spicer, 1995; John and Weitz, 1988; Parmigiani and Mitchell, 2009; Widener, 2004; Zaheer and Venkatraman, 1995)
8. It would be hard for an industry experienced and suitably qualified outsider to work in risk management in our company without additional 'company specific' training.	Training in company-specific skills	Likert Scale – 6pt (Strongly Disagree to Strongly Agree)	(Anderson, 1988; Anderson and Schmittlein, 1984; Ang and Cummings, 1997; Aubert et al., 1996a; John and Weitz, 1988; Klein, 1989; Klein et al., 1990; Lohtia et al., 1994; McIvor, 2009; Wang, 2002; Widener, 2004; Zaheer and Venkatraman, 1995)
9. Training in 'company specific' skills for new risk management staff represents a significant investment for our company.	Training in company-specific skills	Likert Scale – 6pt (Strongly Disagree to Strongly Agree)	(Ang and Cummings, 1997; Artz and Brush, 2000; Colbert and Spicer, 1995; De Vita et al., 2009; Klein, 1989; Klein et al., 1990; Lohtia et al., 1994; McIvor, 2009)
11. A high degree of 'company-specific' skills are required to effectively carry out risk management in our organisation.	Requirement for company-specific skills	Likert Scale – 6pt (Strongly Disagree to Strongly Agree)	(Anderson, 1988; Anderson and Schmittlein, 1984; Ang and Cummings, 1997; Artz and Brush, 2000; Aubert et al., 1996a; Heide and John, 1988; John and Weitz, 1988; Klein, 1989; Klein et al., 1990; McIvor, 2009; Parmigiani and Mitchell, 2009; Wang, 2002; Zaheer and Venkatraman, 1995)
13. Could you estimate on average how many hours per year each employee who works in risk management undertakes 'company specific' training?	Training in company-specific skills	Actual hours	(Anderson and Schmittlein, 1984; Aubert et al., 1996a; John and Weitz, 1988; Lohtia et al., 1994; Speklé et al., 2007; Widener, 2004; Widener and Selto, 1999)

3.3.3.2 Contractual characteristics, staff turnover and education level

TCE predicts that transactions characterised by a high level of asset specificity are supplied in house as it eliminates the expense of writing and effectively executing complex contracts. Contextually, this economises on bounded rationality and reduces opportunism. Therefore, where a high degree of specialisation is required (high asset specificity), both parties are committed to the transaction in a bilateral exchange for a considerable period thereafter once the investment has been made. The company that has contracted for these services cannot easily turn to alternative sources and the skills the employee or external supplier has obtained are not easily transferable elsewhere. Hence, when asset specificity is high, both parties make special efforts to design an exchange contract that has good continuity properties (Williamson, 1981a).

Aubert et al., (1996b) link contract duration to asset specificity arguing that transactions requiring specific investments require a mechanism to protect the investor. One mechanism is to ask for a longer contract duration. Joskow (1985, 1987, 1988, 1990) examines the effects of asset specificity on contracts between coal suppliers and electricity generation plants and find the higher the level of specificity the longer the duration of the contract. Deegan (1997) investigates the relationship between human asset specificity and the design of management remuneration contracts. Results provide evidence of a significant positive relationship between asset specificity and favourable remuneration packages containing incentives such as long run performance measures and termination compensation.

According to resource based theory, human assets are a source of sustainable competitive advantage (Coff, 1997). As such, they are a special form of strategic asset which presents different issues to other assets because they cannot be owned and companies risk losing their employees if they become dissatisfied (Coff, 1997). This is a greater problem if the skills and knowledge of employees is company specific and involves a considerable investment by the company. Companies then attempt to control staff turnover in order to sustain their competitive advantage and employ retention strategies such as favourable contractual terms (Coff, 1997).

Erramilli and Rao (1993) propose that highly asset specific services are characterised by a high level of professional skills acquired through several years of education and training (such as accounting or management consulting), specialised know how and customisation. Knowledge based theory is based on the premise that companies operate with different degrees of 'knowledge intensity' as key factors of production and argue that knowledge intensive companies are associated with having a heavily educated work force (Coff, 1999).

Given the above discussions, table 3.5 below presents the questionnaire items, measurement scales and studies from which they have been derived and/or adapted, used to measure contract characteristics, staff turnover and education level of risk management staff.

Table 3.5 - Survey questionnaire items measuring contract characteristics, staff turnover and education level of risk management staff

Item	Measure	Scale	Basis
If any risk management activities are outsourced: 5. What is the average length of a contract with an external consultant for risk management services?	Contract duration	3 Categories: <1 yr; 1-3 yrs or > 3years	(Abbott et al., 2007; Artz and Brush, 2000; Aubert et al., 1996a; Coff, 1997; Deegan, 1997; Joskow, 1985, 1987, 1988, 1990; McIvor, 2009)
12. Employment contracts with staff working in our company's risk management function include performance incentives designed for retention purposes (e.g. promotion opportunities).	Contract Incentives	Likert Scale – 6pt (Strongly Disagree to Strongly Agree)	(Coff, 1997; Deegan, 1997)
14. Could you estimate the annual rate of staff turnover in your company?	Staff turnover	Actual Percentage	(Coff, 1997; Lohtia et al., 1994)
15. The turnover of staff working in risk management activities compared to staff turnover in other service functions is:	Staff turnover	Likert Scale – 5pt (Much Lower to High	(Coff, 1997)
23. *(b)* Could you estimate what proportion of them *(staff working in risk management)* have professional qualifications such as a university degree or equivalent?	Level of education	Actual Percentage	(Coff, 1997; Erramilli and Rao, 1993)

3.3.3.3 Expenditure on research and development

This study uses the archival measure of expenditure on research and development as a proxy for asset specificity. Levy (1985) argues that research intensive companies tend to rely on transaction specific inputs from human capital and internalise these transactions to minimise associated transaction costs. Levy (1985) finds support

for the proposition that companies with higher levels of research and development internalise transactions using expenditure on research and development as a proxy for asset specificity. Other researchers find that knowledge intensive companies are associated with large investments in research and development (Coff, 2003; Cohen and Levinthal, 1990). Coff (2003) finds evidence of a positive association between expenditure on research and development and mechanisms instituted by management to discourage unwanted takeover bids.

Patents are traditionally used as artificial restrictions to prevent the diffusion of knowledge gained in research and development activities outside of the company (Helfat, 1994). Helfat (1994) argues this focus on patents detracts from the important role research and development plays in altering and enhancing existing company assets, products and production processes. In her study of the U.S. petroleum industry, Helfat proposes that research and development also involves learning which is cumulative, has company specific characteristics and elements which impede imitation and therefore do not transfer easily to other companies (Helfat, 1994).

Widener and Selto (1999) use expenditure on research and development as a proxy for product strategy in their study of the governance determinants of internal audit. Gatignon and Anderson (1988) find evidence that research and development intensive companies prefer to maintain 100 per cent ownership of their foreign subsidiaries. The authors argue that research and development is a measure of asset specificity and companies will adopt unified governance in preference to low levels of integration in its presence (Gatignon and Anderson, 1988).

Given the above arguments and the assumption that risk management is carried out at an enterprise level, it is proposed that research and development activities impact the governance choice due to their transaction specific nature. Hence expenditure on research and development is measured as a proxy for asset specificity. Table 3.6 summarises the measure, scale and relevant studies discussed above.

Table 3.6 – Research and development archival proxy for asset specificity

Archival Proxy	Measure	Scale	Basis
Asset specificity	Expenditure on research and development	Scaled as a proportion of operating revenue	(Abbott et al., 2007; Coff, 2003; Cohen and Levinthal, 1990; Gatignon and Anderson, 1988; Helfat, 1994; Levy, 1985; Widener and Selto, 1999)

3.3.4 Uncertainty

Recall that the second key dimension that increases transaction costs is uncertainty associated with the underlying transaction and the economic exchange partners involved. Within the construct uncertainty, researchers distinguish between environmental uncertainty and behavioural uncertainty (Anderson, 1985, 1988; Anderson and Schmittlein, 1984; Gatignon and Anderson, 1988; John and Weitz, 1988; Kent, 2011; Speklé et al., 2007; Widener and Selto, 1999).

3.3.4.1 Environmental uncertainty

As previously stated, Noordewier et al., (1990) define environmental uncertainty as 'unanticipated changes in circumstances surrounding an exchange'. Volatility is the extent the environment is changing, with more rapid environment changes harder to adapt to and to predict future outcomes. Researchers have explored the construct within the theoretical framework of TCE resulting in a many different conceptual abstracts. However, results are inconsistent and, therefore, there is a lack of empirical support.

The uncertainty of the external environment is subject to the individual perception of decision makers and survey questionnaires have informed various environmental uncertainty studies. Gordon and Narayanan (1984) examine the effect of perceived environmental uncertainty on organisational structure and management accounting systems, distinguishing between stable versus dynamic environments. Gordon and Narayanan (1984) refer specifically to the organisation's industrial, economic, technological, competitive and customer environments. A number of survey studies discuss and measure environmental 'dynamism' as a factor in the sourcing decision (John and Weitz, 1988; Klein, 1989; Klein et al., 1990)

Various studies, (for example Anderson, 1985, 1988; Anderson and Coughlan, 1987; Anderson and Schmittlein, 1984; Gatignon and Anderson, 1988; John and Weitz, 1988; Speklé et al., 2007; Widener and Selto, 1999; Zaheer and Venkatraman, 1995) measure environmental uncertainty as a single independent variable in their empirical modelling. This study breaks environmental uncertainty into the three broad constructs of volume/demand, technological and diversity (Klein et al., 1990; Walker and Weber, 1984). The hypotheses developed within the TCE theoretical framework predict that environmental uncertainty, due to volume/demand and technological uncertainty, leads to internalisation of risk management activities within the company. This is discussed further in section 3.3.3.2. Uncertainty due to environmental diversity leads to outsourcing of risk management activities, a discussion of which is provided in section 3.3.3.3. In accordance with prior research, a survey questionnaire and archival data are used to measure a number of individual variables representing these three constructs.

3.3.4.2 Volume/demand and technological uncertainty

Volume/demand uncertainty is when companies do not know the exact quantity of a product or service. Walker and Weber (1984) describe this as uncertainty due to fluctuations in demand and the degree of confidence in estimating the variability. This construct is measured in various studies by the archival proxy of variance in sales over a period (Anderson and Schmittlein, 1984; Artz and Brush, 2000; Levy, 1985; Widener and Selto, 1999) and survey questionnaires (Artz and Brush, 2000; Gilley and Rasheed, 2000b; Gordon and Narayanan, 1984; John and Weitz, 1988; Klein, 1989; Klein et al., 1990; McIvor, 2009; Murray and Kotabe, 1999; Parmigiani and Mitchell, 2009; Speklé et al., 2007; Walker and Weber, 1984; Wang, 2002; Widener and Selto, 1999; Zaheer and Venkatraman, 1995).

Technological uncertainty is defined by technological change (Afuah, 2001; Walker and Weber, 1984) and prior studies have measured the construct by a survey questionnaire (Ang and Cummings, 1997; Gilley and Rasheed, 2000b; Gordon and Narayanan, 1984; Widener and Selto, 1999). Gilley and Rasheed (2000b) examine the effects of outsourcing on company performance, measuring environmental dynamism from a technological and strategic perspective. Ang and Cummings (1997) measure technological uncertainty as a factor affecting the sourcing of information systems in the

banking industry. Widener and Selto (1999) measure the impact of changes in information technology on the quality of internal audit services.

Table 3.7 presents the questionnaire items, archival proxy, measurement scales and studies from which they have been derived and/or adapted used to measure the two aspects of environmental uncertainty (volume/demand and technological) associated with a company's risk management activities.

Table 3.7 - Survey questionnaire items and archival proxy measuring environmental uncertainty, volume/demand and technological

Item	Measure	Scale	Basis
18. How stable/dynamic would you rate the external economic environment facing your company?	Environmental uncertainly – demand/volume (dynamism)	Likert Scale – 5pt (changing very slowly - changing very rapidly)	(Artz and Brush, 2000; Gilley and Rasheed, 2000b; Gordon and Narayanan, 1984; John and Weitz, 1988; Klein, 1989; Klein et al., 1990; McIvor, 2009; Murray and Kotabe, 1999; Parmigiani and Mitchell, 2009; Speklé et al., 2007; Wang, 2002; Widener and Selto, 1999; Zaheer and Venkatraman, 1995)
19. What is your assessment of the rate of technological change in your industry?	Environmental uncertainly – technological	Likert Scale – 5pt (changing very slowly - changing very rapidly)	(Ang and Cummings, 1997; Gilley and Rasheed, 2000b; Gordon and Narayanan, 1984; Widener and Selto, 1999)
Archival Proxy	**Measure**	**Scale**	**Basis**
Variance in sales.	Environmental uncertainly – demand/volume	Standard deviation of operating revenue for previous three years	(Anderson and Schmittlein, 1984; Artz and Brush, 2000; Aubert et al., 2003; John and Weitz, 1988; Levy, 1985; Walker and Weber, 1984; Widener and Selto, 1999)

3.3.4.3 Environmental uncertainty due to diversity

Recall that diversity of the environment reflects the extent to which there are multiple sources of uncertainty in the environment reflected in the heterogeneous nature of a company's operations. The requirement to make strategic decisions increases as environmental complexity rises (Aldrich, 1979). Hence, companies with more diverse heterogeneous environments including many competitors, diverse customer bases,

subsidiaries and geographic locations require a greater quantity of complex information which is likely to lead to a preference for flexible information flow. TCE predicts that this is obtained more cost effectively from external suppliers such as accounting practices and other specialist consultants leading to less integration of the risk management function. This study draws on the existing literature and measures the individual aspects of environmental uncertainty due to diversity, internal functional diversity, the extent of heterogeneity of business operations and diversity due to changes in business organisation.

Survey respondents provided information regarding the extent of modifications or adaptions needed for risk management processes for different departments or divisions. This is used as a measure internal functional diversity. Aubert et al., (1996a) use a survey questionnaire to measure the degree of job standardisation as a measure of uncertainty. Widener and Selto (1999) and Speklé et al., (2007) measure variation in business activities for internal auditors using a questionnaire item.

Second, the heterogeneous nature of a company's operations is measured by the three archival proxies of competition, number of subsidiaries and the proportion of revenues from foreign operations. The Herfindahl-Hirschman Index is used as a statistical measure of concentration as a proxy for competition. Klein et al., (1990) measure the degree of competition in a company's environment as a measure of diversity. The Herfindahl-Hirschman Index measures market concentration by squaring the market shares of all companies in a market sector and then summing the squares. This provides companies with larger market share a greater weight than those with a smaller market share. The index reaches a maximum value of one when a monopoly exists and declines towards zero when calculated on a percentage basis of market share, with the introduction of increasing competitors. This is consistent with economic theory, which suggests that the greater the concentration of output in a small number of companies the greater the likelihood that competition in the market is low. In contrast, if concentration is low, competition is stronger (Rhoades, 1993).

The Herfindahl-Hirschman Index is used in a variety of contexts across research disciplines. In an empirical governance study, Boyd (1995) uses the Herfindahl-Hirschman Index on the basis that the number of companies in an industry group and

their relative inequalities in market share are indicators of environmental complexity. Levy (1985) measures the degree of diversification of unrelated products by the Herfindahl-Hirschman Index, finding a negative relation with vertical integration (positive with outsourcing) as predicted by the theory.

The number of subsidiaries and revenue from overseas operations as a proportion of total revenues are used to measure operational diversity of the company. Kent (2011) measures environmental diversity as the number of subsidiaries and finds a positive relation with the outsourcing of management advisory services. A number of studies propose that overseas operations are an indicator of environmental complexity, measuring the number of geographic locations (Brouthers and Brouthers, 2003; Erramilli and Rao, 1993; Gatignon and Anderson, 1988; Klein, 1989) and revenue from foreign operations (Abbott et al., 2007).

Finally, Widener and Selto (1999) use their survey questionnaire to measure any acquisition, divestitures or reorganisations in the respondent company as a measure of environmental uncertainty. Kent (2011) finds that purchases of management advisory service from external suppliers are associated with restructuring. This study uses archival data from databases (Finanalysis and Captial IQ) to ascertain if there has been a re-structure, acquisition or merger in the past three years as a measure of environmental diversity.

Table 3.8 presents the questionnaire items, archival proxies, measurement scales and studies from which they have been derived and/or adapted used to measure environmental diversity associated with a company's risk management activities.

Table 3.8 - Survey questionnaire item and archival proxy measuring environmental diversity

Item	Measure	Scale	Basis
17. To what extent do risk management processes have to be adapted or modified to suit different divisions/departments requirements?	Environmental diversity	Likert Scale – 5pt (no modification - completely modified)	(Aubert et al., 1996a, 2003; Speklé et al., 2007; Widener and Selto, 1999)
Archival Proxy	**Measure**	**Scale**	**Basis**
Environmental Diversity	Heterogeneous nature of operations	Herfindahl-Hirschman Index	(Boyd, 1995; Klein, 1989; Klein et al., 1990; Levy, 1985)
Environmental Diversity	Heterogeneous nature of operations	Number of subsidiaries	(Kent, 2011)
Environmental Diversity	Heterogeneous nature of operations	Foreign sales as a percentage of total sales	(Abbott et al., 2007)
Environmental Diversity	Disclosure of acquisitions, divestitures, restructures	Dichotomous variable 1=event in past three years	(Kent, 2011; Widener and Selto, 1999)

3.3.4.4 Behavioural uncertainty

Recall that behavioural uncertainty is associated with the evaluation of individual productivity and performance of human assets (Alchian and Demsetz, 1972; Williamson, 1981a), and is of special importance to an understanding of TCE issues (Williamson, 1985, p. 57). Behavioural uncertainty reflects the difficulty of evaluating and measuring the performance of those undertaking risk management activities in the context of this study. TCE predicts that the greater the degree of behavioural uncertainty associated with a company's risk management activities the greater the degree of internal generation of the function. In this study, two aspects of behavioural uncertainty associated with risk management activities are measured. These are management's evaluation of the performance of external suppliers and new management's evaluation of existing staff.

The questionnaire instrument is used in this study to measure the perceived difficulty of performance measurement for external suppliers of risk management activities. Many studies use this methodology to measure behavioural uncertainty. Anderson and Schmittlein (1984) assess the perceived difficulty of measuring

individual performance of salespeople equitably. Klein (1989) measures the extent to which all aspects of performance conditions are included in written contracts between exporters of products and external suppliers. Brouthers and Brouthers (2003) explore disparities between service and manufacturing companies' international entry mode choice measure the difficulty of writing and enforcing contracts. Aubert et al., (1996a) consider the formalisation of contracts in the information systems department. McIvor (2009) explores the specification of standards of performance in contracts between three large U.S. companies and external suppliers of goods and services using structured in depth face to face interviews. Widener and Selto (1999) and Speklé et al., (2007) measure the degree of actual and perceived difficulty in evaluating the performance of outsourced internal audit activities.

This study measures change in management by the archival proxy whether there has been a change in the CEO in the past two years as a measure of behavioural uncertainty. Recall that Kent (2011) proposes that established management have a relative advantage in the performance evaluation of internal employees to new management who are unfamiliar with their new employees' knowledge, expertise and potential for opportunistic behaviour. This increases relative behavioural uncertainty in evaluating internal employees and hence new members entering the organisation seek the advice of independent advisers outside the organisation rather than internal advisers.

Table 3.9 presents the questionnaire items and archival proxies used to measure the degree of behavioural uncertainty associated with a company's risk management activities. The items and measurement scales are modified or adapted from existing studies.

Table 3.9 Survey questionnaire items and archival proxy measuring behavioural uncertainty

Item	Measure	Scale	Basis
10. It is or would be difficult to include all aspects of performance (e.g. quantity, quality & timeliness) in contractual arrangements with any external consultants we engage for risk management activities.	Perceived difficulty of performance evaluation measurement	Likert Scale – 6pt (Strongly Disagree to Strongly Agree)	(Aubert et al., 1996a; Brouthers and Brouthers, 2003; Klein, 1989; McIvor, 2009; Speklé et al., 2007; Widener and Selto, 1999)
If any risk management activities are outsourced: 16. How easy it is to evaluate the quality of outsourced risk management activities in your company?	Perceived difficulty of performance quality measurement	Likert Scale – 5pt (very difficult – very easy)	(Anderson and Schmittlein, 1984; Aubert et al., 1996a; Brouthers and Brouthers, 2003; Klein, 1989; McIvor, 2009; Speklé et al., 2007; Widener and Selto, 1999)
Archival Proxy	**Measure**	**Scale**	**Basis**
Behavioural uncertainty	New Management's Perceived difficulty in evaluating existing staff	Dichotomous variable 1= change in CEO in last two years	(Kent, 2011)

3.3.5 Frequency

Recall that the TCE dimension of frequency represents the volume and value of transactions over time (Speklé et al., 2007). TCE predicts a greater volume of transactions provides greater potential for gaining benefits from economies of scale and so reducing production costs and leads to internal specialisation (Klein, 1989; Klein et al., 1990). Prior studies have used a number of alternative single and composite measures for frequency.

A number of archival proxies have been used in the prior literature to measure frequency of transactions. Studies that provide evidence to support frequency as a predictor of governance mode include Anderson and Schmittlein (1984), who find company size measured by asset value to be a significant independent explanatory variable in determining the extent of integration of a sales force. Klein (1989) and Klein et al., (1990) in their study of vertical control in international markets measure frequency as sales volume by a survey instrument and find a strong relation with channel integration of the marketing and distribution functions. Erramilli and Rao (1993) use the number of employees as a measure of company size when examining the preferred governance mode for service industries entering foreign markets. Zaheer and

Venkatraman (1995) examine a sample of independent insurance agencies and find a significant positive relation between company size measured by operating revenue and the extent of integration. Murray, and Kotabe (1999) examine the sourcing strategies of U.S. service companies measure frequency of transaction by a survey questionnaire and results support the theory. Kent (2011) measures frequency as a function of the size of the company measured by asset value and finds a significant negative relation with the amount of management advisory services purchased from external suppliers.

In contrast Nam et al., (1996), in their study of outsourcing information systems, find a significant positive relation between company size measured by sales revenue and outsourcing. Parmigiani and Mitchell (2009) examine the extent of outsourcing in the components manufacturing industry and find companies are more likely to outsource as the number of employees rises. Carey et al., (2006) find no relation between company size measured by asset value and the outsourcing of internal audit. Beaumont and Sohal (2004) find size measured by number of employees, revenue and scope of operations has little relation to the decision to outsource.

A number of prior studies have measured frequency using a composite variable of questionnaire items and archival measures. Widener and Selto (1999) use three questionnaire items and three archival proxies, and Speklé et al., (2007) use two questionnaire items plus two archival proxies. Both studies find strong support for frequency as a predictor of governance choice consistent with the theory using this methodology. This study adopts the approach of combining questions and archival measures.

Table 3.10 presents the questionnaire items and archival proxies used to measure frequency of transaction for risk management activities. Two questionnaire items directly seek to measure the frequency and volume of risk management activities undertaken in the period. These are the volume of risk management projects and magnitude of direct expenditure on risk management. These measures are combined with three archival proxies of company size to produce a single variable for frequency in the statistical analysis discussed in Chapter 5.

Table 3.10 Survey questionnaire items and archival proxies measuring frequency

Item	Measure	Scale	Basis
21. Could you estimate how many separately identifiable risk management projects and ongoing operational activities (including internal audit, special projects, fraud analysis) were performed in your company for the 2009 financial year?	Volume of transactions	Number of individual projects	(Klein, 1989; Klein et al., 1990; Murray and Kotabe, 1999; Speklé et al., 2007; Widener and Selto, 1999)
22. Could you estimate your company's total expenditure on risk management activities undertaken in the 2009 financial year?	Magnitude of expenditure	Total expenditure on risk management scaled by total operating expenditures	Developed by researcher
Archival Proxies	**Measure**	**Scale**	**Basis**
Number of employees	Frequency	Number of employees	(Beaumont and Sohal, 2004; Erramilli and Rao, 1993; Parmigiani and Mitchell, 2009; Speklé et al., 2007; Widener and Selto, 1999)
Operating Revenue	Frequency	Operating Revenue Log of Operating Revenue	(Beasley et al., 2005; Beaumont and Sohal, 2004; John and Weitz, 1988; Klein et al., 1990; Nam et al., 1996; Speklé et al., 2007; Widener and Selto, 1999; Zaheer and Venkatraman, 1995)
Total Assets	Frequency	Natural Logarithm of Total Assets	(Abbott et al., 2007; Anderson, 1985; Anderson and Schmittlein, 1984; Carey et al., 2006; Kent, 2011; Widener and Selto, 1999)

3.3.6 Control variables

A number of alternative factors could influence the sourcing decision for a company's risk management activities. Table 3.11 on page 72 presents questionnaire items and archival proxies used to measure company characteristics identified by prior research likely to influence the external sourcing decision.

The sample companies used in this study are representative of all ten industry sectors on the ASX. A number of prior studies examining governance choice from a TCE perspective have focused on a specific industry to detect differences in practice and avoid the results being compounded by industry-specific effects. These include studies that have focused on the electronic components industry (Anderson, 1985, 1988;

Anderson and Coughlan, 1987; Anderson and Schmittlein, 1984), the coal industry (Joskow, 1985, 1987, 1990), automotive components (Monteverde and Teece, 1982) and information technology (Ang and Cummings, 1997; Aubert et al., 1996a, 2003; Wang, 2002).

Recall that a company's risk management activities are likely to be related to the industry in which they operate and industry bodies can restrict management's discretion with regard to risk management activities (Christie et al., 2003). It is argued this influence relates to the nature and magnitude of activities rather than governance choice which is a function of company specific factors as predicted by TCE. However, in order to control for potential confounding effects of industry, this study has adopting a modified version of a U.S. industry schema developed by (Christie et al., 2003) as an industry level control for knowledge transfer costs as a factor influencing the governance choice decision. The 67 Global Industry Classification Standard sub-sectors are classified to the equivalent U.S. Standard Industry Classification and categorised as non specialised (0.0), mixed (0.5) or specialised (1.0). Each company in the sample under analysis is then classified according to these criteria and assigned a value. This information is presented in Appendices B-1 to B-5.

A company derives its competitive strength from its proprietary assets and is protective about losing these to an alliance partner (Kale et al., 2000). Thus, companies whose operations involve significant proprietary knowledge are expected to minimise the use of external consultants and conduct activities in house even though outsourcing may incur lower transaction costs. Therefore, this study uses the degree of exposure to proprietary information as a control variable because it is likely to influence the governance choice for risk management activities. It is expected that the greater proportion of time risk management staff spend working with proprietary information indicates more internal production. On the basis human expertise and knowledge are related to human asset specificity, other studies have included working with proprietary and information as a measure of asset specificity (Abbott et al., 2007; Anderson, 1985; Anderson and Schmittlein, 1984; Brouthers and Brouthers, 2003; Christensen et al., 2009; Speklé et al., 2007; Widener and Selto, 1999). This study is based on the assumption that risk management activities by definition have a degree of

confidential/proprietary content and treats this variable individually as a control distinct from the four separate measures of asset specificity specified in the empirical model.

As previously stated, prior research indicates that the reputation of the external supplier is a key consideration when companies consider outsourcing activities to external suppliers (Beasley et al., 2005; Kent, 2011; Wang, 2002). Kent (2011) proposes that the large international accounting firms are likely to have increased knowledge and expertise in offering management advisory services. Results from Kent's research indicate that companies purchase more management advisory services when their external auditor is from one the top five international accounting firms[30]. Hence, this study identifies the service provider for both external audit and risk management activities as either Big4, non Big4 accounting practice or other professional service provider on the basis that companies are more likely to outsource to external suppliers with a reputation for quality regardless of other factors.

TCE proposes that a company's decision to internalise or outsource their risk management is determined by the relative transaction costs for each alternative. However, the ability to make this choice is based on the assumption that a company has the resources available to implement the decision. Establishing and maintaining a risk management function is costly and the literature identifies a number of financial factors outside of the TCE framework that have the capacity to restrain internalisation of the function. This study controls for the level of capital intensity measured as the ratio of fixed assets to operating revenue (Erramilli and Rao, 1993), financial distress indicated by the company making a loss in two of the three previous years and growth measured by percentage growth in total assets in previous three years (Abbott et al., 2007; Kent, 2011). Leverage has the capacity to reduce the financial resources available and preclude a company from contracting for risk management activities from any suppliers and is measured as total liabilities as a proportion of total assets (Kent, 2011).

Recall this study draws on prior research to explore alternative explanations for internalising and outsourcing risk management at activities. The survey questionnaire

[30] In the time period under analysis in the Kent (2011) study, five international accounting firms constituted the Big 5, Arthur Anderson, Deloitte & Touche, Ernst & Young, KPMG and PriceWaterhouseCoopers.

instrument concludes with a request for respondents to identify any of six reasons to internalise and six reasons to outsource risk management activities relevant to their company. Table 3.12 on page 73 presents the questionnaire items and relevant studies referenced as the basis for each item.

Table 3.11 - Control variables

Item	Measure	Scale	Basis
Industry	Knowledge transfer costs per industry	Interval scale represented by three categories, 0.0, 0.5 and 1	(Christie et al., 2003; Demsetz, 1988)
20. Approximately how much time did your staff and/or external consultants performing risk management activities spend working with 'commercial in confidence/proprietary' information?	Extent of exposure to proprietary information	Four Categories: 0%, < 50%; > 50%; uncertain	(Abbott et al., 2007; Anderson, 1985; Anderson and Schmittlein, 1984; Brouthers and Brouthers, 2003; Christensen et al., 2009; Kale et al., 2000; Speklé et al., 2007; Widener and Selto, 1999)
Reputation	Quality of external supplier	Dichotomous variable 1=Big4 provider of risk management services or external audit	(Beasley et al., 2005; De Vita et al., 2009; Kent, 2011; Wang, 2002)
Capital Intensity	Restraint on internalisation of risk management function	Ratio of fixed assets to operating revenue	(Erramilli and Rao, 1993)
Growth (previous 3 years)	Restraint on internalisation of risk management function	Percentage change in total assets over previous three years	(Abbott et al., 2007; Kent, 2011)
Financial Distress	Restraint on internalisation of risk management function	Dichotomous variable 1=if loss made in two of three previous years	(Abbott et al., 2007; Kent, 2011)
Leverage	Restraint on internalisation of risk management function	Total liabilities as a proportion of total assets	(Kent, 2011)

Table 3.12 – Survey questionnaire items for other reasons to internalise or outsource risk management activities

Q 24.Reasons to INTERNALISE	**Basis**
Strategic importance	(Arnold, 2000; Beaumont and Sohal, 2004; Gilley and Rasheed, 2000b; Lonsdale, 1999; Lonsdale and Cox, 2000; Quinn and Hilmer, 1994; Raiborn et al., 2009; Selim and Yiannakas, 2000)
Difficulty of managing relationships with external providers	(Beaumont and Sohal, 2004; Quinn and Hilmer, 1994; Raiborn et al., 2009; Serafini et al., 2003)
To mitigate risk of sub-optimal service	(Beaumont and Sohal, 2004; Lonsdale and Cox, 2000; Selim and Yiannakas, 2000; Serafini et al., 2003)
Non-standard nature of tasks	(Beaumont and Sohal, 2004)
To maintain flexibility	(Beaumont and Sohal, 2004; Lonsdale and Cox, 2000; Quinn and Hilmer, 1994; Raiborn et al., 2009; Serafini et al., 2003)
Economies of scale	(Kakabadse and Kakabadse, 2002)
Q 25. Reasons to OUTSOURCE	**Basis**
Access to expertise	(Kakabadse and Kakabadse, 2002; Lankford and Parsa, 1999; Quélin and Duhamel, 2003; Selim and Yiannakas, 2000; Serafini et al., 2003)
To concentrate on core activities and competencies	(Arnold, 2000; Beaumont and Sohal, 2004; Gilley and Rasheed, 2000b; Kakabadse and Kakabadse, 2002; Lankford and Parsa, 1999; Quélin and Duhamel, 2003; Selim and Yiannakas, 2000)
Share risks	(Beaumont and Sohal, 2004; Caplan and Kirschenheiter, 2000; Gilley and Rasheed, 2000b; Selim and Yiannakas, 2000)
Variable demand requirements	(Beaumont and Sohal, 2004; Serafini et al., 2003)
To achieve best practice	(Kakabadse and Kakabadse, 2002; Selim and Yiannakas, 2000; Serafini et al., 2003)
Routine nature of activity	(Abbott et al., 2007; Widener, 2004)

3.4 CHAPTER SUMMARY

This chapter describes the research methodology adopted in the development of the research instrument. A survey questionnaire and archival proxies are developed to measure and operationalise the three transactional dimensions predicted by TCE to influence the governance choice for risk management activities of ASX listed companies. Chapter 4 describes the research protocol employed to design and administer the survey questionnaire.

CHAPTER 4
RESEARCH PROTOCOL

4.1 INTRODUCTION

This study identifies the factors that determine how ASX listed companies' resource their risk management function. Chapter 3 describes the research methodology used to measure and operationalise the three transactional dimensions predicted by TCE to influence the governance choice for risk management activities, to test the hypotheses developed in chapter 2. This chapter outlines the research protocol employed in the design and administration of the survey questionnaire and proceeds in the following manner. Section 4.2 presents an overview of the research development and protocol which is conducted in three stages, stage one is described in chapter 3. Section 4.3 describes stage two, the questionnaire refinement process. Section 4.4 describes stage three, the administration of the survey questionnaire instrument. Section 4.5 describes the construction of each of the individual hypothesised variables for inclusion in the regression analysis, and section 4.6 concludes the chapter.

4.2 OVERVIEW OF THE RESEARCH PROTOCOL

A survey questionnaire is administered by mail and email to obtain data that is combined with archival data from company annual reports to operationalise attributes measured. This study requires insight into organisational policies and practices with regard to ASX listed companies' risk management activities (Baruch and Holtom, 2008).

A key objective of this research is generalisablity to the population of companies listed on the ASX in 2009 and administering a survey questionnaire to a large sample is an appropriate approach (Flynn et al., 1990). Mail administered surveys are one of the most frequently used methods of data collection in empirical TCE research (Macher and Richman, 2008). Flynn et al., (1990, p. 262) note that "mail surveys are very effective for well defined research topics with a fairly narrow scope".

The survey questionnaire, incorporating a variety of research methods, is developed in three stages to ensure the reliability and validity of the research instrument and a summary of this process is presented at the end of this section. The reliability of a

research instrument is concerned with consistency of measurement of the constructs[31] for operationalisation (Sekaran, 2003) and is a prerequisite for establishing validity (Flynn et al., 1990). Validity is concerned with how well an instrument measures the construct it is intended to measure (Flynn et al., 1990; Sekaran, 2003).

The first stage in the survey questionnaire development process, item generation and scale development is described in chapter 3. The second stage involves refinement procedures to maximise the survey's response rate, given generalisablity is a key objective. The questionnaire is designed using the principles of the Total Design Method to survey a large sample of the population of ASX listed companies (Dillman, 1972, 1978, 1991; Dillman, Christenson, Carpenter, and Brooks, 1974). The Total Design Method is a theoretically driven comprehensive system with prescribed procedures that consistently enhances response rates for most survey populations (Dillman, 1991).

The third stage is survey administration. The survey questionnaire is sent to the Chief Financial Officer (or Company Secretary if not available) of 1811 companies[32] listed on the ASX as at 31st December 2009 over a six week period from March to May 2010. This is the first full reporting period for ASX listed companies under the enhanced reporting requirements for risk management. The sample surveyed represents approximately 90 per cent of the population of companies listed on the ASX domiciled in Australia in this time period. Two follow-up questionnaires are administered by mail and email and a 17.10 per cent response rate was achieved. Data from the questionnaire is tested for reliability and validity, and then operationalised with archival data from company annual reports in empirical models. Table 4.1 below presents a summary[33] of this research protocol.

[31] A construct is a theoretical creation based on observations which cannot be observed directly or indirectly (Babbie, 1998).
[32] Contact details and financial report data was available from database sources for 1863 companies, 52 were excluded, 93 were returned undeliverable and 77 declined to participate. Final sample size is 1641.
[33] This table is a modification of a table presented in a study by Aubert et al. (1996a) describing a three-stage validation process for a survey instrument to measure the transactional dimensions of information systems transactions.

Table 4.1 - Summary of research instrument development & administration process

Research Instrument Development & Administration Process		Goodness of Measures
Stage 1- Construction of measures: item/scale generation and development ***(discussed in chapter 3)***	• Review of existing measures (questionnaire item and scales) from prior literature across a variety of disciples and assembly of questionnaire item master. • Construction of measures by a process of modification and adaption of existing measures to risk management research context. • Construction of initial research instrument consisting of 54 items and corresponding measurement scales for questionnaire and 15 archival proxies. • Initial research instrument review and feedback from expert panel.	• Reliability and content validity • Content and face validity
Stage 2 - Refinement of research instrument	• Design of questionnaire with 25 items and corresponding measurement scales. • Second and third research instrument review and feedback from expert academic panel. • Pilot survey sent to three CFOs for feedback by telephone interview resulting in minor adjustments. • Final research instrument review and feedback from expert panel prior to ethical review.	• Content and face validity
Stage 3 - Survey administration	• Survey questionnaire administered to 1811 ASX listed companies by mail. Two follow up questionnaires administered by mail and email. • Data from survey questionnaires combined with archival data from respondents annual reports for analysis. • Statistical tests for reliability: non-response bias, early versus late response bias, mail versus email response bias and construct validity: logit and multiple regression.	• Response bias reliability • Construct validity

4.3 REFINEMENT PROCEDURES – STAGE 2

Following item generation and scale development as described in chapter 3, the second stage of the development process refines the research instrument prior to administration. This involves questionnaire design, further review and feedback and a survey pilot.

4.3.1 Survey Design

Sampling the population is an efficient technique to obtain information about the whole (Yu and Cooper, 1983). However, efficiency does not translate to accuracy and there is the risk that the validity and reliability of the results are threatened by non-response bias. Non-response bias occurs if those that do not respond are systematically

different from those that do, thus compromising the generalisablity of the results (Flynn et al., 1990). To address this issue the survey is designed using the Total Design Method developed by Don Dillman (Dillman, 1972, 1978; Dillman et al., 1974). Total Design Method utilises social exchange theory as a theoretical framework positing that recipients undertake a cost benefit appraisal when making the decision about whether or not to respond.

The intended survey recipient is the Chief Financial Officer or Company Secretary of each ASX listed company in the surveyed population. Top executives have intense demands on their time and receive frequent requests from academic scholars and other researchers for information. Baruch (1999) notes that executive response rates had declined over the previous two decades due to the increasing number of surveys received. Cycyota and Harrison (2006) suggest that this trend combined with increasing pressure on executives of running organisations has prompted many companies to adopt a formal company policy to reject survey requests. In a meta-analysis of survey response rates in the management literature from 1992 to 2003, Cycyota and Harrison (2006) find evidence of a significant decline in response rates. Hence, a key objective of the survey design is maximisation of the response rate.

Top executives are more likely to answer questions if the topic is salient (i.e., important to them at the time), relates directly to their responsibilities and is relevant to their organisational environment (Baruch, 1999; Cycyota and Harrison, 2002; Heberlein and Baumgartner, 1978). There is a strong positive correlation with salience and response rates (Sheehan and McMillan, 1999). In their meta-analysis, Cycyota and Harrison (2006) find evidence that salience alone contributes to variation in the response rates from top managers. The Total Design Method approach treats salience as a manipulable variable that can be enhanced by ensuring the questionnaire design process addresses three primary considerations. First, reduction of perceived costs by making the questionnaire appear simple and, therefore, less time consuming to complete. Second, increase perceived rewards by making the questionnaire items relevant and of interest to the respondents. Third, promote trust by identifying professional affiliation, noting sponsorship and guaranteeing anonymity.

Quality control formats for questionnaire design are applied to ensure readability (Dillman, 1978). These include formatting to accommodate question scales, the use of shading to separate items, font of sufficient size, and use of bold and italics. Clearly stating each anchor label enhances interpretation of measurement results (Weng, 2004). The questionnaire (see Appendices A-1 and A-2), containing 25 items, is designed to fit on both sides of one page as the length of a questionnaire is one of the main motivations for not completing a survey (Tomaskovic-Devey, Leiter, and Thompson, 1994).

Each questionnaire is accompanied by a covering letter (see Appendices A-2 and A-3) containing an explanatory statement personally addressed to each recipient printed on quality stationary with a university letterhead. Personalisation establishes the importance of the respondents' information, the special role of each respondent and demonstrates greater effort on the part of the researcher (Dillman, 1972). Previous research has identified university affiliation as a positive influence on postal mail survey response rates (Sheehan and McMillan, 1999).

The covering letter is clearly titled and composed to identify the research focus, highlighting risk management and the additional compliance burden companies face with the adoption of the amended corporate governance Principle 7: Identify and Manage Risk (Dillman, 1972, 1978). Confidentiality is a primary concern for executives and research provides evidence that a guarantee of anonymity improves response rates (Falconer and Hodgett, 1999; Jobber and O'Reilly, 1998). For identification purposes, each letter is referenced to the company's individual ASX code and, therefore, an explanation is provided, along with an assurance of anonymity and an invitation to contact the researchers by telephone or email about any aspect of the survey. The letter concludes with an expression of thanks and is personally signed with the electronic signatures of the principal researchers. As an incentive, the letter and questionnaire highlight the opportunity for respondents to receive a copy of the results. Monetary incentives are not considered due to budgetary considerations and the nature of the target audience. Research indicates that the use of material incentives in surveys does not have any discernable effect on response rates amongst executives (Baruch and Holtom, 2008; Cycyota and Harrison, 2002; Dillman, 1991).

It is suggested that postage paid replies improve response rates (Cycyota and Harrison, 2006; Jobber and O'Reilly, 1998). A return addressed reply paid envelope is included in each letter for the respondents' convenience.

Table 4.2 summarises the application of the Total Design Method (TDM) recommendations in the survey administration process. The questionnaire and accompanying letters (initial and follow ups) are presented in Appendices A-1 to A-7.

Table 4.2 Summary of TDM recommendations implemented in survey administration

TDM Recommendation	Implementation in survey
Explanatory letter	• Letter personalised to CFO by name and position on Bond University colour letter heading and signed using scanned signature. • Brief summary of topic, scope, relevance, regulatory environment and research application, value and benefits on front page. Comprehensive explanatory statement on back page. • Limited time requirement to complete questionnaire highlighted. • Contact details of researchers and invitation to follow up queries by telephone or email. • Assurance of anonymity and explanation of coding. • Reply paid for convenience. • University affiliation and sponsorship obtained from professional associations. • Ethical approval noted and confirmation contact details provided. • Anticipatory thanks and incentive offered (copy of results and report).
Questionnaire	• Questions ordered to ensure congruence with explanatory letter. • Use of question writing principles to ensure ease of task of reading and answering. • Use of formatting principles to ensure ease of task of reading and completing questionnaire, for example alternative shading, contrasting font size, use of bold and italics. • Survey designed to fit on one page (front and back) to reduce appearance of time and effort required to compete task of questionnaire completion.
Incentive	• Offer to send copy of report and results.
Mail Follow up	• Two follow ups with informative covering letters that politely explain relevance of survey and consequence of non receipt. Replacement questionnaire and reply paid envelopes included.
Email survey follow up	• Administered by an online service provider, SurveyMonkey, for third follow up where email address could be obtained from database. • Adapted to suit electronic delivery mode maintaining adherence to same principles as mail survey.

The questionnaire and covering letters were reviewed and feedback provided by the expert panel prior to pilot testing. A pilot survey was then sent to three Chief

Financial Officers from ASX listed companies who agreed to provide feedback by telephone interviews. A number of minor modifications are made as a result of this process. The final research instrument, consisting of questionnaire and accompanying letters with explanatory statement for initial and follow ups, was sent to the university ethics committee for approval prior to survey administration.

4.4 SURVEY ADMINISTRATION – STAGE 3

The third stage of the development process is administration of the survey. This involves sample selection, key informant selection, and distribution and follow up of the survey. The survey administration commenced with the first questionnaire mailing on the 24th March 2010. The first follow up reminder was sent one month later on the 27th April 2010 and the second on the 11th May 2010. The companies surveyed were asked to report on their risk management activities for the financial year ending in 2009 which is the first full reporting period for ASX listed companies under the enhanced reporting requirements for risk management. Companies listed on the ASX are subject to the revised principles guidance on risk management in the first financial year commencing on or after 1st January 2008. Therefore, the first disclosures are for companies with a reporting period ending 31st December 2008. Companies with a 30th June year end did not have to report until 30th June 2009.

4.4.1 Sample selection

The company is the unit of analysis in this empirical research study. Of the approximately 2000 companies listed on the ASX that reported in 2009, contact details and financial reporting data are available from the databases Aspect Huntly FinAnalysis, Morningstar DatAnalysis and Standard and Poor's Capital IQ for 1863 companies. Listed managed investment schemes [34] are excluded from the study due to their

[34] A managed investment scheme is a scheme, often in the form of a unit trust, in which investors (members) pool their contributions to acquire an interest to benefits in the scheme which commonly invest in financial assets such as fixed interest securities, equities and related securities, property securities, financial derivatives. Members of the scheme do not have day to day control over the operation of the scheme. A Responsible Entity must be appointed, who has the dual role of trustee and manager. A Responsible Entity must be an Australian public company holding a dealer's licence. It is common for a responsible entity to manage numerous listed managed investment schemes. There is also specific application of the principles for trusts and externally managed entities under the governance of a responsible entity (Desmarchelier, 1999).

management structure and type of operations. Listed foreign entities with their head office located overseas are also excluded due to the difficulty in them corresponding. This resulted in a final sample size of 1811 companies who were sent the survey questionnaire.

4.4.2 Key informant selection

The survey questionnaire was addressed to the Chief Financial Officer as the key informant. If there was no designated Chief Financial Officer then the questionnaire was sent to the Company Secretary. The key informant selection is based on two criteria. First, the Chief Financial Officer is one of the two parties[35] required under legislation to provide certification with regard to the company's risk management activities. Second, the Chief Financial Officer, in their financial and operational capacity, is assumed to have access to the requisite information relating to risk management activities across the organisation. Deloitte (2009, p. 7) note in their guide to Principle 7 that 'an individual should be charged with implementing the risk management process and establishing a process to ensure that the reporting requirements of the Principle 7 are met. In small to medium companies this is often the Company Secretary or the Chief Financial Officer'. The ASX Corporate Governance Council (2007a, p. 19) state in the Principles that "the company secretary plays an important role in supporting the effectiveness of the board by monitoring that board policy and procedures are followed, and coordinating the timely completion and despatch of board agenda and briefing material".

4.4.3 Survey follow ups

Research has consistently shown a powerful determinant of response rates to promote salience is the number of attempts made to contact the sample unit (Dillman, 1972; Dillman et al., 1974; Flynn et al., 1990; Heberlein and Baumgartner, 1978). Persistent follow ups can translate into increases of between 6 and 18 per cent (Cycyota and Harrison, 2002). Dillman (1972) recommends up to three follow ups containing replacement questionnaires. For individuals who have received the first survey, it underscores the importance of information and participation and serves to promote guilt in non-respondents (Cycyota and Harrison, 2002). The first follow up is administered

[35] Refer to discussion in Chapter 1, section 1.2: Regulatory Background.

by mail and contains a polite reminder, another copy of the survey and reply paid addressed envelope (see Appendix A-5).

The internet provides researchers the opportunity to improve response rates by the use of email as an additional method of survey delivery (Dillman, Phelps, Tortora, Swift, Kohrell, Berck, and Messer, 2009). As mail and email surveys rely on individuals' comprehension of written text, mode effects do not differ (Schaefer and Dillman, 1998) and the principles that apply to paper surveys also apply to web based surveys (Andrews, Nonnecke, and Preece, 2003; Schaefer and Dillman, 1998). There are numerous benefits of email surveys which include cost savings from postage paper and labour administration (Schaefer and Dillman, 1998), rapid speed of transmission and ease of response. Email surveys, are also less likely to be ignored as junk mail (Bachmann, Elfrink, and Vazzana, 1996; Tse, 1998), and where there is a preference for the convenience of email over mail the choice of response mode is appreciated. Mehta and Sivadas (1995) observe many tasks are completed in the electronic medium and completing an email survey is less likely to break the work continuum than completing a mail survey. In addition, the immediacy of the electronic medium also provides the opportunity for dialogue with the respondent[36].

The second and third follow ups were administered by email for those non-respondents whose email addresses were obtainable (otherwise mail). The email survey used in this study, administered by SurveyMonkey[37], is essentially an electronic version of the mail survey. The recipient was sent an email containing the same invitation as the mail follow up letters with an invitation to participate in the survey by a secured link. In addition, an opt-out offer to decline from the survey was included as recommended in the literature (Andrews et al., 2003).

4.4.4 Response rate

A 17.10 per cent response rate was achieved. Response time varied from two days to 111 days. Ninety-three survey questionnaires were returned over the

[36] Twelve respondents telephoned the researcher to comment on a number of issues including opportunity to engage with academe, guarantee of anonymity and salience of topic.
[37] SurveyMonkey is online web-based software that enables users to create and administer questionnaires by email.

administration period, undeliverable to the addressee. New contact details were obtained and the survey resent. Returns after this period were not resent and excluded as undeliverable from the sample size (Carcello, Hermanson, and Raghunandan, 2005). Seventy-seven companies that declined to participate and returned the survey with a statement of company policy against survey completion were also excluded from the sample. This resulted in a final sample size of 1641 companies and 281 questionnaires were returned. Data from the respondent questionnaires was coded and entered into an excel spreadsheet by an experienced research assistant in order to avoid possible bias introduced by the researcher (Flynn et al., 1990).

The response rate from this study's survey is comparable with governance studies conducted in the field of internal audit. Widener and Selto (1999) and Speklé et al., (2007) in their studies of outsourcing internal audit from a TCE perspective, report useable response rates of 14 per cent and 15 per cent respectively. Response rates from other U.S studies are similar. Serafini et al., (2003) received 81 responses from 447 Chief Audit Executives surveyed (18 per cent). Beasley et al.(2005) achieved a 10.3 per cent response rate from a survey of Chief Financial Officers on the implementation of enterprise risk management. Trahan and Gitman (1995) achieve a 12 per cent response rate from a survey of Chief Financial Officers on barriers to using sophisticated financial management decision-making techniques. In a survey of Chief Executive Officers on their attitude to organisational change conducted in 1988, Hambrick, Geletkanycz and Fredrickson (1993) achieved a 20 per cent response rate. Gilley and Rasheed (2000a) surveyed top executives exploring the relationship between outsourcing core versus peripheral activities and firm performance and achieved a 17 per cent response rate.

A recent Australian study by Christopher, Sarens and Leung (2009) surveyed 206 Chief Audit Executives by email and received 34 responses (17 per cent). Beaumont and Sohal (2004) achieved an 8 per cent response rate when surveying the Chief Executive Officers of Australian companies on the factors impacting the outsourcing decision in 2002. Falconer and Hodgett (1999), in an examination of executive response rates from international studies, concur that a range of 10 to 35 per

cent is to be expected with time and organisational constraints as the major constraining factors.

4.5 CONSTRUCTION OF VARIABLE MEASURES

Recall that data from two primary sources are used to operationalise the variables of interest in this study. The survey questionnaire is designed to capture company specific information about the risk management function not available from public sources. This is used in conjunction with archival data from company annual reports to test the hypotheses presented in chapter 2. A discussion follows on the construction of each of the individual hypothesised variables for inclusion in the regression analysis, the results of which are discussed in chapter 5.

4.5.1 Dependent variables

Prior studies have frequently modelled the dependent variable, governance mode, as a binary variable: internalise or outsource (Abbott et al., 2007; Aubert et al., 1996a; Parmigiani and Mitchell, 2009). Fewer studies have modelled the dependent variable using the proportion of outsourced activities (Abbott et al., 2007; Anderson and Schmittlein, 1984; Carey et al., 2006; John and Weitz, 1988; Parmigiani and Mitchell, 2009; Speklé et al., 2007; Widener and Selto, 1999). This study models the dependent variable, the choice to outsource risk management activities both ways, as a predicator of the proportion of risk management activities outsourced (D_1) and as a binary decision ($D_{2\ \&\ 3}$ - yes/no or high/low) using data collected from the survey questionnaire. The variables are constructed from a combination of two items on the questionnaire. Item 2 presents three discrete choices for the outsourcing of risk management activities, (all internal/all outsource/combination), and item 3 provides survey recipients with a choice of six categories of the percentage outsourced. Responses are coded accordingly and cross referenced for validity. Each respondent company is assigned a value corresponding to one of eight categories to produce an interval scale from a value of 0 to a value of 7 for $D_{1,}$ the proportion of risk management services outsourced. The binary decision is coded as 1 if the company outsource some/all risk management services, 0 otherwise. A third dependent variable (D_3) is produced for the subsample of 125 companies outsourcing some/all risk management activities according to the

magnitude of activities outsourced. Given the limited outsourcing of risk management activities a value of one is given to the 38 companies outsourcing greater than 25 per cent of their risk management activities, zero otherwise. Sensitivity analysis is conducted categorising only the 12 companies outsourcing 50 per cent or more as high outsourcers of risk management activities and assigned a value of 1. Results are qualitatively similar overall although significance is lower in some variables.

4.5.2 Asset specificity

Recall that the specificity of the human assets associated with a company's risk management activities are the company specific skills and knowledge not transferrable to another company. This study uses a combination of survey questionnaire items and archival data from company annual reports to measure four different aspects of the TCE construct asset specificity of a company's risk management function. Four individual variables are constructed for inclusion in the regression analysis for the whole sample. The independent variable for company specific knowledge and training is measured by the sum of the individual scores from a 6 point Likert attitudinal scale from four questionnaire items (7, 8, 9 and 11). The higher the score, the higher the implied level of asset specificity. The reliability of the scale is measured producing a Cronbach's coefficient of 0.72 indicating the individual items are reliably measuring the same underlying construct at an acceptable level (DeVellis, 1991). Reliability relates to the precision and the consistency of the instrument to measure its intended construct (DeCoster, 2005; Sekaran, 2003). Cronbach's alpha is commonly used and indicates how well the items measuring a concept are positively correlated to one another, and the closer to one the higher the internal consistency and reliability (Sekaran, 2003).

The second and third variables, contractual characteristics and staff turnover, are measured as interval scales constructed from two questionnaire items (12 and 15) using 6 and 5 point Likert attitudinal scales respectively. Item 15 is reverse coded[38]. The fourth variable representing asset specificity is the archival proxy, expenditure on research and development as a proportion of operating revenue. Two additional

[38] Reverse coded items are re-worded so that lower responses indicate a larger amount of the abstract construct of interest and incorporated in order to encourage respondents to read each question carefully (DeCoster, 2005; Herche and Engelland, 1996).

variables are constructed from questionnaire items 5 and 6 for analysis of the subsample of companies outsourcing risk management activities. Companies are assigned a value of 1 (less than one year), 2 (one to three years) or 3 (more than three years) according to contract length with external suppliers (item 5). A dichotomous variable is used to measure if training is provided to external suppliers with companies assigned a value of 1 if so, otherwise 0 (item 6). Item 13, requesting respondents to quantify the number of hours spent on company specific training, is not used in the analysis due to 27 per cent of companies (75) indicating this information was not available.

4.5.3 Environmental uncertainty

Recall that environmental uncertainty is a broad concept encompassing a number of different constructs (Kent, 2011). This study decomposes environmental uncertainty into three separate dimensions, volume/demand, technological and diversity, which predict different governance modes.

Volume/Demand: Recall that volume/demand uncertainty is when companies do not know the exact quantity of a product or service. Two variables for this dimension are operationalised in the regression analysis. First, based on the existing literature, the variable for the dynamic nature of the external economic environmental is constructed from questionnaire item 18, a 5 point Likert attitudinal scale (Artz and Brush, 2000; Gilley and Rasheed, 2000b; Gordon and Narayanan, 1984; John and Weitz, 1988; Klein, 1989; Klein et al., 1990; McIvor, 2009; Murray and Kotabe, 1999; Parmigiani and Mitchell, 2009; Speklé et al., 2007; Wang, 2002; Widener and Selto, 1999; Zaheer and Venkatraman, 1995). Second the archival proxy, the standard deviation of sales in the past three years, is used to measure uncertainty in volume/demand in a number of studies (Anderson and Schmittlein, 1984; Artz and Brush, 2000; Aubert et al., 2003; John and Weitz, 1988; Levy, 1985; Walker and Weber, 1984; Widener and Selto, 1999).

Technological: Recall technological uncertainty is defined in terms of the pace of technological change and the unpredictable changes in technical requirements such as standards, component specification or general technological developments. Based on the existing literature this variable is constructed from questionnaire item 19, a 5 point

Likert attitudinal scale (Ang and Cummings, 1997; Gilley and Rasheed, 2000b; Gordon and Narayanan, 1984; Widener and Selto, 1999).

Diversity: Recall, diversity of the environment reflects the extent to which there are multiple sources of uncertainty in a company's internal and external environment. This study draws on existing literature and uses five individual variables to measure diversity. First internal functional diversity is constructed from item 17, a 5 point Likert attitudinal scale measuring the degree of modifications or adaptions required to risk management processes required to suit different departments or divisions (Aubert et al., 1996a; Speklé et al., 2007; Widener and Selto, 1999). Second, the heterogeneous nature of a company's operations is operationalised by the four archival proxies of competition, number of subsidiaries, proportion of overseas revenue and whether the company has had a re structure, acquisition or merger in the past three years.

The Herfindahl-Hirschman Index is used as a statistical measure of concentration as a proxy measure for competition. The Herfindahl-Hirschman Index for 2009 is calculated by squaring the market shares of all companies in each of the 147 GICS Sub-industry[39] sectors and then summing the squares. This produces an index with a maximum value of one when a monopoly exists, declining towards zero in a purely competitive market with the introduction of more and more companies in each industry sector. In order to ease interpretation and maintain consistency of predicted direction with the other hypothesised variables for diversity, the calculated Herfindahl-Hirschman Index is rescaled (1 minus the index) to rise as competition in the industry sector increases.

Environmental diversity is measured as the number of subsidiaries (Kent, 2011) and the proportion of revenues from foreign operations (Abbott et al., 2007). Diversity through changes in the company's organisational structure is measured as a dichotomous variable given a value of one if there has been a re-structure, acquisition or merger or in the past three years, zero otherwise. Widener and Selto (1999) uses a survey questionnaire to measure any acquisition, divestitures or reorganisations in the respondent company as a measure of environmental uncertainty. Kent (2011) finds

[39] Recall Global Industry Classification Standard (GICS) consists of 10 Sectors aggregated from 24 Industry Groups, 67 Industry sectors and 147 Sub-Industry sectors.

purchases of management advisory service from external suppliers are associated with restructuring.

4.5.4 Behavioural uncertainty

Recall, behavioural uncertainty is associated with the evaluation of individual productivity and performance of human assets (Alchian and Demsetz, 1972; Williamson, 1981a). This study measures three aspects of behavioural uncertainty associated with risk management activities. First, the perceived degree of difficulty in defining performance parameters in contracts for external suppliers is constructed from a 6 point Likert scale (item 10) (Anderson and Schmittlein, 1984; Aubert et al., 1996a; Klein, 1989; McIvor, 2009; Speklé et al., 2007; Widener and Selto, 1999). Second, evaluation of the quality of outsourced risk management activities by company's management is constructed from a 5 point Likert attitudinal scales (item 16, reverse coded) for use in the analysis of the subsample of companies that outsource risk management activities. Third, the behavioural uncertainty implications for new management are measured by a dichotomous variable and given a value of one indicating a change in the CEO in the past two years, zero otherwise (Kent, 2011).

4.5.5 Frequency

It is highly likely that company size directly impacts on transaction frequency for risk management activities. A number of studies have used archival proxies (Anderson and Schmittlein, 1984; Erramilli and Rao, 1993; Kent, 2011; Klein, 1989; Klein et al., 1990; Murray and Kotabe, 1999; Zaheer and Venkatraman, 1995) and composite measures incorporating questionnaire items (Speklé et al., 2007; Widener and Selto, 1999). This study measures frequency by a composite variable derived from three archival proxies (number of employees, revenue, total assets). Due to the different measuring scales of the individual components, each of the three measures are standardised[40] and the proxy score for frequency is measured by the mean of the standardised item scores (Speklé et al., 2007). Two additional questionnaire items intended to measure frequency were included in the survey. Item 21 requested survey

[40] Each input is standardised by subtracting the mean and dividing by the standard deviation of the individual measure.

recipients to estimate the number of individual projects and item 22 the total expenditure on risk management activities. However a large number of respondents reported this data as unavailable precluding their use in the regression analysis.

4.5.6 Control variables

As it is likely other company characteristics influence the sourcing decision for risk management activities this study includes seven control variables in the statistical modelling. First, in order to control for potential confounding effects of industry this study has adopting a modified version of a U.S. industry schema developed by (Christie et al., 2003) as an industry level control for knowledge transfer costs, a factor influencing the governance choice decision. The sixty-seven Global Industry Classification Standard (GICS) industry sub-sectors used to classify ASX listed companies are classified to the equivalent U.S. standard industry classifications system[41] (SIC) categories and assigned values as either non-specialised (0.0), mixed (0.5) or specialised (1.0) according to the Christie et al., (2003) schema. The industry descriptions and categorisation criteria data are presented in Appendices B-1 to B-5.

Second, this study measures exposure to proprietary information as a categorical variable because companies whose operations involve significant proprietary knowledge are expected to minimise the use of external consultants and conduct activities in house even though outsourcing incurs lower transaction costs. Item 20 provides four discrete choices for the amount of time risk management staff spend working with proprietary/commercial in confidence information. Reponses are assigned values, zero equals 0 per cent, one equals less than 50 per cent, two equals more than fifty per cent. The fourth choice, 'uncertain', elicits 24 responses. There are several methods of coding 'uncertain' responses (Evans, Flores, and Boyle, 2002). This study systematically substitutes each of the three discrete alternatives thereby constructing three alternative variables for inclusion in the statistical analysis[42].

[41] Standard Industrial Classification is a U.S. government system for classifying industries by a four-digit code.
[42] This variable is not significant in any of the regression models under any of the three alternative classifications.

Third, this study codes reputation as a dichotomous variable assigning a value of one if the service provider for external audit and/or risk management activities is a Big4 accounting practice, otherwise zero on the basis companies are more likely to outsource due to quality considerations.

Recall that according to TCE, a company's decision to internalise or outsource their risk management is a determined by the relative transaction costs for each option. However, the ability to make this choice is based on the assumption that the company has the resources available to make this decision. Drawing on the existing literature, this study controls for financial factors which have the capacity to restrain internalisation of the risk management function. Capital intensity measured as the ratio of fixed assets to operating revenue (Erramilli and Rao, 1993) and growth measured as percentage change in total assets over three years (Abbott et al., 2007; Kent, 2011) signal rising resource commitments whose costs make it harder for companies to establish functions internally regardless of other factors. Financial distress is measured as a dichotomous variable equalling one if the company has reported a net loss in two of the previous three years, zero otherwise (Abbott et al., 2007). Leverage has the potential to reduce financial resources available and preclude a company from contracting for risk management activities is measured as total liabilities as a proportion of total assets (Kent, 2011). Table 4.3 below presents a summary of the constructed variables for operationalisation in the regression analysis.

Table 4.3 – Summary of variables constructed for statistical analysis

Construct	Data Source: Questionnaire / Archival	Variable Label
Dependent Variables:		
Proportion of risk management activities outsourced	2 and 3	D_1
Outsource risk management activities (yes/no)	2	D_2
Outsource risk management activities (high/low)	2 and 3	D_3
Independent Variables:		
Asset specificity - Company specific knowledge and training	7,8,9 and 11 6	Skills and Training Training Externals
Asset specificity - Contractual characteristics	12 5	Contract Incentives Contract Duration
Asset specificity – Staff turnover	15	Staff Turnover
Asset specificity – expenditure on research and development	Research and Development/total operating revenue	Research and Development
Environmental uncertainty – dynamism	18	Dynamism
	Std. dev. of sales in the past 3years	Volume/Demand
Environmental uncertainty – technology	19	Technology
Environmental uncertainty – diversity	17	Modifications
	Hirschman-Herfindahl Index	Competition
	No. of subsidiaries	Subsidiaries
	Proportion of overseas revenue	Overseas Revenues
	If re-structure, acquisition or merger or in the past 3 years	Restructure
Behavioural uncertainty – performance evaluation	10 and 6	Performance Evaluation Performance Quality
Behavioural uncertainty – new management	If change in the CEO in the past 2 years	New Management
Frequency	number of employees, revenue, total assets	Frequency
Control Variables:		
Industry level control for knowledge transfer costs	Modification of Christie et al., (2003) schema.	Industry
Exposure to proprietary information	20	Proprietary
Reputation of external supplier	If Big4 supplier	Big4
Resource constraint on establishing internal risk management function	Ratio of fixed assets to operating revenue	Capital Intensity
	Percentage change in total assets over previous three years	Growth (previous 3 years)
	Dichotomous variable 1=if loss made in two of three previous years	Financial Distress
Resource constraint on risk management activities	Total liabilities as a proportion of total assets	Leverage

4.6 CHAPTER SUMMARY

Chapter 3 described the development of the survey questionnaire items and archival proxies for measurement of the governance choice and the three transactional dimensions predicted by TCE to influence the governance choice for risk management activities of ASX listed companies. This chapter presents an overview of the research protocol employed in the development, design and administration of the survey questionnaire instrument. Chapter 5 presents the empirical models used to test the hypotheses developed in chapter 2 and discusses the results.

CHAPTER 5
RESULTS AND ANALYSIS

5.1 INTRODUCTION

This study seeks to identify factors impacting a company's decision to internally generate or outsource their risk management function. Chapter 2 presented four hypotheses based on the theoretical framework of transaction cost economics (TCE). A transaction's attributes can be characterised by the three broad principal dimensions of asset specificity, uncertainty and frequency according to TCE. It is these dimensions which determine why some transactions are internalised and directed by managers in a hierarchy and others are outsourced in the market to external suppliers. It is proposed that the specificity of a company's human assets engaged in risk management activities is associated with less outsourcing. Increases in environmental uncertainty due to demand/volume and technological change, behavioural uncertainty and transaction frequency are related to less outsourcing. In contrast, higher levels of environmental diversity due to the heterogeneous nature of a company's operations and the behavioural uncertainty implications for new management are associated with increased outsourcing.

Data is obtained from a survey questionnaire instrument and archival data from company annual reports in order to test the hypotheses. Chapter 3 describes the research methodology used to measure each of the hypothesised variables for operationalisation in the statistical analyses. Chapter 4 outlines the research protocol employed in the development, design and administration of the survey questionnaire sent to ASX listed companies requesting information about their risk management function for the financial year ending 2009. Linear and logistic multivariate regression analysis is used to test the hypotheses and explain the governance choice for risk management activities for ASX listed companies.

This chapter presents and discusses the results of the analyses. Section 5.2 presents the descriptive statistics for the hypothesised variables and alternative explanations for outsourcing risk management activities. Section 5.3 presents the results from the linear and logistic multivariate regression analyses for the sample of 271 companies responding to the survey. Section 5.4 presents the results from the linear and

logistic multivariate regression analyses for the sub sample of 125 of these companies outsourcing risk management activities. Section 5.5 provides further discussion of the results of the analysis. Section 5.6 presents tests conducted for response bias. Section 5.7 discusses the results of the linear regression analysis incorporating multiplicative interaction terms. Section 5.8 concludes the chapter.

5.2 DESCRIPTIVE STATISTICS

The analysis of the results begins with descriptive statistics of the surveyed sample of companies for the nature, extent and sourcing characteristics of their risk management activities. The questionnaire data from 271 useable respondent companies is combined with archival financial data for hypotheses testing in linear and logistic multiple regression analysis. 125 companies reported outsourcing some risk management activities and this subsample is analysed independently.

5.2.1 Descriptive statistics – risk categories

All respondent companies identified risk categories covered under a risk management system. Table 5.1 provides data for the fourteen identified categories of risks covered under a company's risk management system. Financial reporting, compliance and operational risks are identified as the top three categories of risk in coverage and as the top three priority risks. Environmental, sustainability and climate change are the least identified categories of risk and low priorities. Risk associated with human capital and the environment are the most frequently outsourced categories. The mean number of risk categories identified is 8.98, with a minimum of 1 and a maximum of 17 where additional categories are specified as covered under the company's risk management system[43].

[43] The other categories of risk identified as covered under the company's risk management system by five respondents are political/sovereign, legal/legislative, industry, capital management and financial (hedging, liquidity and tax management).

Table 5.1 – Descriptive statistics for risk categories covered under a company's risk management system

Risk Category n=271	Yes	%	OS'd	%	Top 3	%
Financial Reporting	260	95.94	48	17.71	134	49.45
Compliance	253	93.36	37	13.65	124	45.76
Operational	231	85.24	12	4.43	99	36.53
Safety	219	80.81	21	7.75	85	31.37
Ethical Conduct	195	71.96	12	4.43	24	8.86
Strategic	191	70.48	18	6.64	47	17.34
Market Related	180	66.42	11	4.06	42	15.50
Technological	152	56.09	28	10.33	36	13.28
Product/Service Quality	137	50.55	6	2.21	38	14.02
Reputation/Brand	136	50.18	8	2.95	31	11.44
Human Capital	134	49.45	199	73.43	21	7.75
Environmental	124	45.76	165	60.89	24	8.86
Sustainability	101	37.27	11	4.06	17	6.27
Climate Change	61	22.51	10	3.69	10	3.69

5.2.2 Descriptive statistics – (whole sample)

Table 5.2 reports the descriptive statistics for the dependent variables, the type of external supplier and the dichotomous variables. Results suggest approximately half (54 per cent) of Australian listed companies do not outsource any risk management activities. Of the companies in the sample outsourcing risk management activities, 89.80 per cent outsource less than 50 per cent. Professional service providers, other than accounting companies, are used by 59 per cent of the outsourcing companies. Risk management services are provided by the external auditor to 35 per cent of outsourcing companies, 30 per cent of companies use a Big4 accountant and only 22 per cent of companies use a non Big4 accounting company.

Thirty companies in the sample were involved in a restructure, acquisition or merger in the last three years (11 per cent). Sixteen companies (6 per cent) had a change of CEO in the last two years. One hundred and sixty four (61 per cent) companies used the services of a Big4 accounting company for external audit and/or risk management

activities. One hundred and eighty (66 per cent of the sample) reported a loss in two of the previous three years.

Table 5.2 – Descriptive statistics for the dependent variables, dichotomous variables and external providers of risk management activities

Governance choice for risk management activities (n=271)	**Yes**	**%**
All risk management activities sourced in-house	146	53.87
Outsource some risk management activities	125	46.13
1-10% of risk management activities outsourced	29	10.70
11-25% of risk management activities outsourced	58	21.40
26-49% of risk management activities outsourced	26	9.59
50-74% of risk management activities outsourced	10	3.69
75-90% of risk management activities outsourced	2	0.74
100% of risk management activities outsourced	0	0
Dichotomous independent variables (n=271)		
Environmental diversity – restructure, acquisition or merger in last 3 yrs	30	11.07
Behavioural uncertainty – change in CEO in last 2 yrs	16	5.90
Reputation – supplier of risk management activities or external auditor is Big4	164	60.52
Financial distress – if company has made a loss in 2 out of 3 previous years	180	66.42
External Providers of risk management activities (n=125)		
Other Professional Services	74	59.20
External Auditor	44	35.20
Big4 Accountant	37	29.60
Non-Big4 Firm	27	21.60

Table 5.3 (page 98) provides the descriptive statistics for the Likert attitudinal scaled independent variables, categorical and continuous independent variables[44]. Recall, four separate dimensions of asset specificity are measured in this study. The combined measure for company specific skills and training with a mean of 12.38 from a maximum score of 24 indicates the perceived level of specificity of human assets working in risk management is generally low. This is supported by neutral average responses (neither agree or disagree) for the inclusion of contract incentives to retain risk management staff (mean of 3.14 out of 6) and comparison of staff turnover for risk management staff

[44] Extreme values are winsorised at three standard deviations, in order to mitigate the undue influence of outliers.

with other service functions (mean of 3.69 out of 5). One hundred and twenty one (45 per cent) companies reported expenditure on research and development in their annual reports for the year 2009 with an average expenditure as a proportion of operating revenues of 0.24.

Environmental uncertainty in volume/demand is measured by two variables. First, a survey item asking respondents to rate the dynamic nature of the external economic environment with a mean response of 3.43 from a maximum score of 5 indicates companies are operating in an environment changing moderately to rapidly. This is supported by an average standard deviation in sales over the past 3 years of 0.45, the second measure for environmental uncertainty is volume/demand. Environmental uncertainty due to technology is perceived on average to be changing moderately with a mean value of 3.13 from a maximum score of 5.

There are five aspects of environmental uncertainty due to diversity measured in this study. On average, respondents indicate minimal modification or adaption is required for risk management processes to suit different divisions' internal requirements (mean is 2.49 from a maximum of 5). The mean score for the rescaled Hirschman-Herfindahl Index as a measure of competition is 0.62. Recall, as the adjusted index approaches one the market becomes more competitive. The mean number of subsidiaries is 18.84 with the mean proportion of overseas revenues being 0.18. There is a neutral attitude to behavioural uncertainty measured by the degree of perceived difficulty in evaluating and measuring performance of external suppliers of risk management service with a mean value of 3.62 out of a maximum of 6. Recall that frequency is measured as a function of company size by a composite variable. The average number of employees is 1,414 with a range of 1 to 59,000. The average natural log of total revenues[45] is 20.25, with a range 0 to 23.64 and natural logarithm of total assets 21.12, with a range 13.30 to 24.58.

Companies have higher than average knowledge transfer costs according to the schema developed by Christie et al., (2003) when measured by the three categories of knowledge intensity according to industry classification (0, 0.5 or 1) indicated by a

[45] Two companies in the sample reported zero operating revenues. A value of $1 is substituted to enable logarithmic transformation.

mean of 0.73. On average, exposure to proprietary/commercial in confidence information is less than 50 per cent with a mean value of 1.09 for the 247 companies providing definitive responses to the survey item. With an average capital intensity of fixed assets to revenues at 6.58, median of 0.67 and range of 0 to 120 a substantial number of companies in the sample are highly capital intensive. Companies in the sample have average growth over the three year period of 0.41 and an average debt to assets ratio of 0.37.

Table 5.3 - Descriptive statistics for the Likert attitudinal scaled independent variables, categorical and continuous independent variables

Variable: n=271	TCE Dimension	Min	Max	Mean	Median	Std Dev.
Skills & Training	Asset Specificity	4	20	12.38	12	3.44
Contract Incentives	Asset Specificity	1	6	3.14	3	1.37
Staff Turnover in risk management	Asset Specificity	2	5	3.69	2	0.83
Research and Development expenditure	Asset Specificity	0	10.87	0.24	0	1.25
Environmental Dynamism	Environmental Uncertainty	1	5	3.43	4	0.76
Std. dev. of 3 years sales	Environmental Uncertainty	.01	1.73	0.45	0.30	0.42
Technological Uncertainty	Environmental Uncertainty	1	5	3.13	3	0.85
Modifications	Environmental Uncertainty	1	5	2.49	2	0.89
Hirschman-Herfindahl Index	Environmental Uncertainty	0.00	1	0.62	0.67	0.24
No. of subsidiaries	Environmental Uncertainty	0	563	18.84	5	45.50
Proportion of Overseas revenues	Environmental Uncertainty	0	1	0.18	0	0.33
Performance Evaluation	Behavioural Uncertainty	1	6	3.62	4	1.13
Number of employees	Frequency	1.00	59,000	1,414	42	5713
Log. of Total Revenues	Frequency	0.00	23.64	20.25	16.51	21.47
Log. of Total Assets	Frequency	13.30	24.58	21.12	17.70	22.41
Industry	Control	0	1	0.73	1	0.36
Exposure to Proprietary Information (n=247).	Control	0	2	1.09	1	0.52
Capital Intensity	Control	0	120	6.58	0.67	21.34
Growth (in previous 3 yrs)	Control	-0.97	4.08	0.41	0.12	1.06
Total Liabilities/Total Assets	Control	0.01	3.37	0.37	0.33	0.35

5.2.3 Descriptive statistics for the subsample of outsourcing companies

Table 5.4 on page 100 reports the descriptive statistics for the dependent variables, the proportion of risk management activities outsourced, the external supplier and the dichotomous variables for the subsample of 125 companies that outsource risk management activities. Seventy per cent (87 companies) of the sample outsource 25 per cent or less of their risk management activities. Sixteen per cent (20 companies) provided training to their external suppliers of risk management activities. Twelve per cent of companies (15 companies) in the sample are involved in a restructure, acquisition or merger in the last three years and 8.80 per cent (11 companies) had a change of CEO in the last two years. Sixty four per cent (80 companies) from the sample reported a loss in two of the previous three years.

Approximately 66 per cent (82 companies) of the sub sample of outsourcing companies used the services of a Big4 accounting company for external audit and/or risk management activities. Approximately 30 per cent (37 companies) report in the questionnaire using a Big4 accounting company, 60 per cent (74 companies) using other professional service providers, 35.20 per cent (44 companies) the external auditor and 21.60 per cent (27 companies) a non Big4 accountant for risk management activities.

Table 5.4 - Descriptive statistics for the dependent variables, dichotomous variables and external providers of risk management activities for subsample of companies outsourcing risk management activities

Governance choice for risk management activities (n=125)	**Yes**	**%**
1-10% of risk management activities outsourced	29	23.20
11-25% of risk management activities outsourced	58	46.40
26-49% of risk management activities outsourced	26	20.80
50-74% of risk management activities outsourced	10	8.00
75-90% of risk management activities outsourced	2	1.60
100% of risk management activities outsourced	0	0
Low risk management outsourced (<25%)	87	69.60
High risk management outsourced (>25%)	38	30.40
Dichotomous independent variables (n=125)		
Asset Specificity – training to external suppliers	20	16.00
Environmental Diversity – restructure, acquisition or merger in last 3 yrs	15	12.00
Behavioural uncertainty – change in CEO in last 2 yrs	11	8.80
Financial distress – if company has made a loss in 2 out of 3 previous years	80	64.00
Reputation – Supplier of risk management. activities or external auditor is Big4	82	65.60
External Providers of risk management activities (n=125)		
Other Professional Services	74	59.20
External Auditor	44	35.20
Big4 Accountant	37	29.60
Non-Big4 Firm	27	21.60

Table 5.5 on page 103 provides the descriptive statistics for the Likert attitudinal scaled categorical and continuous variables for the subsample of 125 companies that outsource risk management activities. For comparison purposes the results for the whole sample are presented in parenthesis after the reported results from the subsample. The results for the three asset specificity variables are very similar to the whole sample. Company specific skills and training with a mean of 12.58 (12.38) from a maximum score of 24 indicate the level of specificity of human assets working in risk management is generally low. Contract incentives and staff turnover for risk management staff have means of 3.25 (3.14) and 3.76 (3.69) respectively from a maximum score of 6 and 5. The archival proxy used to measure asset specificity, expenditure on research and

development as a proportion of operating revenues has a mean value of 0.06 indicating the subsample is characterised by lower expenditure on research and development compared to the whole sample (0.24). Contract duration for external suppliers of risk management activities has a mean score of 1.61 from the three interval categories (values assigned are one for less than 1 year; two for 1 to 3 years and three for greater than 3 years) indicating the average contract length is less than two years.

This study measured three separate dimensions of environmental uncertainty, volume/demand, technological and diversity. The survey item rating the dynamic nature of the external economic environment has a mean response of 3.47, similar to the whole sample (3.43) indicating outsourcing companies are operating in an environment changing moderately to rapidly. The standard deviation in sales over the past 3 years with a mean value of 0.54 indicates the subsample experienced more volatile sales than the whole sample (0.45). In contrast the subsample is characterised by lower environmental uncertainty due to technology with a mean value of 3.07 (3.13) from a maximum score of 5.

The descriptive statistics for environmental uncertainty due to diversity are broadly similar to the whole sample. On average, respondents indicate minimal modification or adaption is required for risk management processes to suit different divisions internal requirements 2.54 (2.49). The mean score for the rescaled Hirschman-Herfindahl Index as a measure of competition is 0.60 (0.62) from a maximum of one. The mean number of subsidiaries at 22.87 is higher than for the whole sample (18.84) and the proportion of overseas revenues, with a mean of 0.15, is lower than the whole sample (0.18).

Behavioural uncertainty is measured by two survey items. The item measuring the degree of perceived difficulty in evaluating and measuring performance of external suppliers of risk management service has a mean value of 3.75 (3.62). The item measuring the perceived difficulty in evaluating the quality of outsourced risk management activities has a mean of 2.79 out of a maximum of 5.

Recall that frequency is measured as a function of the company size by a composite variable. The multiple measures for frequency indicate outsourcing

companies are smaller than the whole sample, proposing lower frequency of transactions for risk management activities. The average number of employees is 795 (1,414) with a range of one to 15,140. The average natural logarithm of total revenues is 20.16 (20.25), range 0 to 23.13 and total assets 21.04 (21.12), range 13.43 to 24.58.

The industry controls for knowledge intensity and exposure to proprietary/commercial in confidence information in the sub sample of outsourcing companies are very similar to the whole sample with respective means of 0.79 (0.73) and 1.17 (1.09). The average capital intensity of fixed assets to revenues at 8.35 (6.58), median of 1.49 (0.67), indicates outsourcing companies are more highly capital intensive when compared to the whole sample. Companies in the subsample have higher average growth in the previous three years rates (0.52 compared to 0.41) and lower average debt to assets ratios (0.31 compared to 0.37) when compared to the whole sample.

Table 5.5 - descriptive statistics for the Likert attitudinal scaled independent variables, categorical and continuous independent variables for subsample of companies outsourcing risk management activities

Variable: n=125	TCE Dimension	Min	Max	Mean	Median	Std Dev.
Skills and Training	Asset Specificity	4	20	12.58	13	3.41
Contract Incentives	Asset Specificity	1	6	3.25	3	1.43
Staff Turnover in risk management	Asset Specificity	2	5	3.76	4	0.83
Research and Development expenditure	Asset Specificity	0	5.79	0.06	0	0.53
Contract Duration	Asset Specificity	1	3	1.61	1	0.68
Environmental Dynamism	Environmental Uncertainty	2	5	3.47	4	0.69
Std. dev. of 3 years sales	Environmental Uncertainty	0.02	1.73	0.54	0.38	0.48
Technological uncertainty	Environmental Uncertainty	1	5	3.07	3	0.75
Modifications	Environmental Uncertainty	1	5	2.54	2.5	0.78
Hirschman-Herfindahl Index	Environmental Uncertainty	0.00	0.93	0.60	0.68	0.25
No. of subsidiaries	Environmental Uncertainty	0	563	22.87	5	59.33
Proportion of Overseas revenues	Environmental Uncertainty	0	1	0.15	0	0.31
Performance Evaluation	Behavioural Uncertainty	1	6	3.75	4	1.19
Performance Quality	Behavioural Uncertainty	2	5	2.79	3	0.70
No. of employees	Frequency	1.00	15,140	795	47	2191
Log. of Total Revenues	Frequency	0.00	23.13	20.16	16.74	21.18
Log. of Total Assets	Frequency	13.43	24.58	21.04	17.82	22.34
Industry	Industry	0	1	0.79	1	0.34
Exposure to Proprietary Information	Proprietary	0	2	1.17	1	0.52
Capital Intensity	Capital Intensity	0	120	8.35	1.49	24.67
Growth (in previous 3 yrs)	Growth	0	4.08	0.52	0.15	1.13
Total Liabilities/Total Assets	Leverage	0.01	0.95	0.31	0.24	0.27

5.2.4 Correlations and tests of regression residuals

The bivariate correlation matrices[46] reported in tables 5.6 and 5.7 show the number of subsidiaries and frequency are significantly correlated at 0.59 for the whole sample (n = 271) and at 0.81 for the subsample of outsourcing companies (n = 125). The next highest significant correlations are between the volume/demand and financial distress (0.40 where n = 271 and 0.49 where n = 125). However, the values for the variance inflation factors (VIF) collinearity statistics reported in tables 5.9 to 5.12 with the regression results well within accepted guidelines indicating multicollinearity is unlikely to threaten the efficiency of the regression models (Hair Jnr., Tatham, Anderson, Black, and Babin, 2006; O'Brien, 2007).

A Jarque-Bera test for normality of the regression residuals is conducted. The Jarque-Bera test, an asymptotic chi-square distribution with two degrees of freedom, uses the skewness and kurtosis values to test the null hypothesis that the data is from a normal distribution. The Jarque-Bera test returns 16.24 for the linear regression for the whole sample of 271 companies which rejects the null hypothesis of normality at the p > 0 .05 level (p<.00). The Jarque-Bera test result from the regression for the subsample of 125 companies at 3.71 (p = 0.15) indicates the data is from an approximately normal distribution.

A White test for heteroskedasticity is conducted to confirm that the variances of the regression residuals do not bias the variance of the estimated parameters. Heteroskedasticity results in inefficient estimators and biased standard errors, rendering the t tests and confidence intervals unreliable. The White test results (n = 271: F = 1.53, p = 0.06 and n = 125: F = 1. 36, p = 0.15) confirm not to reject the null hypothesis that there is no heteroskedasity.

[46] Tables 5.6 and 5.7 report the results of the bivariate correlations for the restricted models for which the regression results are reported in tables 5.10 and 5.12. Results for the bivariate correlations for the unrestricted models are reported in Appendices C-1 and C-2.

Table 5.6 - Bivariate correlation matrix for restricted model independent variables (n=271)

	Research & Development	Volume/ demand	Technology	Modifications	Competition	Subsidiaries	Overseas Revenues	Restructure	New Management	Frequency	Industry	Big4	Capital Intensity	Financial Distress
Volume/demand	.11													
Technology	.10	.03												
Modifications	.03	.01	.12*											
Competition	-.12*	.09	.00	-.01										
Subsidiaries	-.07	-.22**	.05	.06	-.10									
Overseas Revenues	.07	-.05	-.05	-.08	-.18*	.18*								
Restructure	.02	-.17**	.11	-.04	-.04	.07	.11							
New Management	-.05	-.05	.06	-.02	.08	.01	-.01	.11						
Frequency	-.07	-.22**	.02	.04	-.27**	.59**	.20**	.24**	-.05					
Industry	.11	.32**	-.16*	-.09	-.03	-.12*	.12*	-.06	-.03	-.11				
Big4	.05	-.13*	-.03	.08	-.11	.23**	.08	.12	.01	.25**	-.14*			
Capital Intensity	.33**	.25**	-.02	-.04	-.05	-.06	-.05	-.08	.04	-.09	.17**	.00		
Financial Distress	.13	.40**	-.02	-.10	.09	-.19**	-.06	-.12*	.05	-.25**	.36**	-.16*	.13*	
Leverage	-.12	-.30**	.06	.06	.01	.18**	-.01	.13*	.08	.19**	-.36**	.05	-.16**	-.20**

Note * and ** , correlation statistically significant at 5% and 1% levels (2-tailed)

Table 5.7 - Bivariate correlation matrix for restricted model independent variables (n=125)

	Training Externals	Contract Duration	Staff Turnover	Research and Development	Dynamism	Volume/ Demand	Technology	Modifications	Competition	Subsidiaries	Overseas Revenues	Restructure	Performance Quality	Frequency	Proprietary	Big4	Capital Intensity	Growth (previous 3 years)	Financial Distress
Contract Duration	.04																		
Staff Turnover	.18*	.10																	
Research and Development	-.09	-.05	-.10																
Dynamism	.04	-.01	-.16	.09															
Volume/Demand	-.17	-.01	-.25**	.21*	.17														
Technology	-.02	.11	-.07	.03	.24**	-.02													
Modifications	-.24	.09	-.07	.04	-.06	-.09	.04												
Competition	.05	-.05	-.03	-.02	.07	.11	-.02	.06											
Subsidiaries	.19	-.04	.07	-.03	.05	-.28**	.10	.03	-.09										
Overseas Revenues	-.06	.18	-.13	.29**	-.08	.00	-.01	.00	-.21	.23									
Restructure	.11	-.02	.01	.24**	.17	-.17	.13	.05	.05	.08	.13								
Performance Quality	.13	-.07	-.10	-.07	.07	-.08	-.10	-.21*	.05	.04	-.08	.00							
Frequency	.15	.04	.05	-.04	-.02	-.29	.04	.01	-.25**	.81**	.26**	.18	-.03						
Proprietary	.03	-.08	-.02	-.03	-.01	-.09	.21*	-.09	-.01	.00	-.07	.03	.14	-.01					
Big4	.07	-.10	.02	.03	-.08	-.20	-.03	.09	-.06	.22*	.18*	.15	.02	.26**	-.05				
Capital Intensity	-.11	-.12	-.17	.07	-.04	.29	-.03	-.14	-.01	-.07	-.01	-.09	.07	-.10	.05	-.04			
Growth (previous 3 years)	-.14	.10	.04	.28**	-.02	.17	-.04	.06	-.04	-.08	.11	.09	.05	-.08	.11	.01	.13		
Financial Distress	-.05	-.08	-.23**	.08	.00	.49**	-.10	-.08	.12	-.16	-.19*	-.21*	.18	-.26**	.04	-.20*	.20*	.05	
Leverage	.12	.03	.10	-.07	-.04	-.42**	-.01	.15	.01	.24	.01	.09	.04	.27**	-.01	.13	-.21	-.16	-.35**

Note * and ** , correlation statistically significant at 5% and 1% levels (2-tailed)

5.2.5 Descriptive statistics for alternative explanations

Recall that the survey instrument provided respondents with the opportunity to identify reasons for the governance choice for risk management activities relevant to their company. A list of possible reasons for keeping risk management activities in house and outsourcing them was compiled from a review of alternative theoretical frameworks applied to the governance choice. Survey recipients were asked to identify if any questionnaire items were applicable to their company. Table 5.8 provides the response profile.

Table 5.8 - Response profile for alternative explanations

Reasons to internalise: (n = 281)	**No. of Responses**	**%**
Strategic importance	154	54.80
Economies of scale	108	38.43
To maintain flexibility	100	35.59
Non standard nature of tasks	75	26.69
Mitigate risk of sub-optimal services	60	21.35
Other	46	16.37
Difficulty of managing relationships with external providers	43	15.30
	586	
Reasons to outsource: (n = 281)		
Access to expertise	152	54.09
To achieve best practice	81	28.83
To concentrate on core activities and competencies	52	18.51
Variable demand requirements	36	12.81
Routine nature of activity	16	5.69
Other	12	4.27
Share risks	8	2.84
	357	

Top of the list of reasons to internalise risk management activities is strategic importance, cited by 54.80 per cent of respondents. This supports findings from existing research based on the theoretical predictions of resource based theory (Arnold, 2000; Barney, 1991; Beaumont and Sohal, 2004; Gilley and Rasheed, 2000b; Lonsdale, 1999; Lonsdale and Cox, 2000; Quinn and Hilmer, 1994; Raiborn et al., 2009; Selim and

Yiannakas, 2000). The next most prominent reasons to keep risk management activities in-house are economies of scale (38.43 per cent) and maintaining flexibility (35.59 per cent).

Access to expertise is the most frequently cited reason to outsource (54.09 per cent) by a large margin, with the second most cited reason of achieving best practice cited by 28.83 per cent of respondents, which is in support of the existing literature (Kakabadse and Kakabadse, 2002; Lankford and Parsa, 1999; Quélin and Duhamel, 2003; Selim and Yiannakas, 2000; Serafini et al., 2003).

5.3 STATISTICAL TESTS OF THE HYPOTHESES (WHOLE SAMPLE)

Prior to regression analysis all ratio and interval data is standardised and mean centred. This procedure is performed to accommodate the different measuring scales used for the individual variables (Anderson and Schmittlein, 1984; Erramilli and Rao, 1993; Speklé et al., 2007). This transformation has limited effect on the estimated coefficients and minimises multicollinearity which is a well documented problem in multiple regression models containing main effects and interaction terms (Kromrey and Foster-Johnson, 1998)[47].

5.3.1 Regression analyses

A multivariate regression model operationalises the independent variables to predict the governance choice for risk management activities for the sample of 271 ASX listed companies that provided useable responses to the survey. The initial model presented for linear and logistic regression is specified as follows:

$$DV1_{1,2} = \beta_0 + \beta_1 \text{Skills and Training} + \beta_2 \text{Contract Incentives} + \beta_3 \text{Staff Turnover} + \beta_4 \text{Research and Development} + \beta_5 \text{Dynamism} + \beta_6 \text{Volume/Demand} + \beta_7 \text{Technology} + \beta_8 \text{Modifications} + \beta_9 \text{Competition} + \beta_{10} \text{Subsidiaries} + \beta_{11} \text{Overseas Revenues} + \beta_{12} \text{Restructure} + \beta_{13} \text{Performance Evaluation} + \beta_{14} \text{New Management} + \beta_{15} \text{Frequency} + \beta_{16} \text{Industry} + \beta_{17} \text{Proprietary} + \beta_{18} \text{Big4} + \beta_{19} \text{Capital Intensity} + \beta_{20} \text{Growth} + \beta_{21} \text{Financial Distress} + \beta_{22} \text{Leverage} + e$$

[47] Note the regression results with and without this procedure are qualitatively the same. Tables 5.2 to 5.5 present the descriptive statistics for each variable using the unadjusted data.

Where[48]:

DV_1 = the proportion of risk management services outsourced by category where 0=0%; 1=1-10%; 2=11-25%; 3=26-49%; 4=50-74%; 5=74-90%; 6=90-99%; 7=100%

DV_2 = a dichotomous variable for outsourcing of risk management services; 1 if any risk management services are outsourced, 0 otherwise.

Skills and Training = the depth of company specific skills, knowledge and training required computed from the standardised mean centred score for survey items 7,8,9 and 11. A higher score indicates greater asset specificity for risk management activities.

Contract Incentives = the use of contract incentives to promote staff retention in the risk management function from the standardised mean centred score for survey item 12. A higher score indicates greater asset specificity for risk management activities.

Staff Turnover = staff turnover in risk management relative to other service functions from the standardised mean centred score for survey item 15. A higher score indicates greater asset specificity for risk management activities.

Research and Development = expenditure on research and development as a proportion of operating revenues, standardised and mean centred. A higher proportion indicates greater asset specificity for risk management activities.

Dynamism = the perceived dynamism of the external environment facing the company from the standardised mean centred score for survey item 18. A higher score indicates greater environmental uncertainty.

Volume/Demand = the variance (standard deviation) in sales over the past three years, standardised and mean centred. A higher variance indicates greater environmental uncertainty.

[48] A full list in alphabetical order of variable labels and descriptions used in this study is provided in Appendices D-1 to D-3.

Technology = the rate of technological change in a company's industry from the standardised mean centred score for survey item 19. A higher score indicates a higher rate of technological change.

Modifications = the extent of modifications/adoptions required for risk management activities to suit different divisions/departments from the standardised mean centred score for survey item 17. A higher score indicates greater environmental uncertainty due to diversity.

Competition = the degree of competition in the industry sub sector calculated as the Herfindahl-Hirschman Index, rescaled, standardised and mean centred. A higher score indicates greater environmental uncertainty due to a more competitive environment.

Subsidiaries = the number of subsidiaries, standardised and mean centred. A higher number indicates greater environmental uncertainty.

Overseas Revenues = the proportion of total revenue from overseas sales, standardised and mean centred. A higher proportion indicates greater environmental uncertainty.

Restructure = equals 1 if the company has had any restructures, acquisitions or mergers in the past 3 years and 0 otherwise. A value of one indicates greater environmental uncertainty.

Performance Evaluation = the degree of perceived difficulty in measuring performance of any or potential external consultants engaged for risk management activities from the standardised mean centred score for survey item 10. A higher score indicates greater behavioural uncertainty.

New Management = equals 1 if the CEO changed in the period 2008-2009, 0 otherwise. A value of one indicates greater behavioural uncertainty for new management with regard to existing staff.

Frequency = the mean centred average of the standardised scores for the number of employees, total revenues and total assets. A higher score indicates more frequent risk transactions.

Industry = control variable for industry knowledge transfer costs measured by a categorical variable where 0 equals low, 0.5 equals medium and 1equals high. A higher value indicates greater industry knowledge transfer costs.

Proprietary = a categorical variable where 0 equals none, 1 equals less than 50 per cent and 2 equals more than 50 per cent from survey item 20.

Big4 = a dichotomous variable where 1 equals external supplier of risk management services and/or external auditor is a Big4 accounting company, 0 otherwise.

Capital Intensity = the ratio of fixed assets to operating revenue, standardised and mean centred.

Growth = the percentage change in total assets over previous three years, standardised and mean centred.

Financial Distress = a dichotomous variable which equals 1 if the company makes a loss in two of three previous years, 0 otherwise.

Leverage = total liabilities divided by total assets, standardised and mean centred.

Table 5.9 below reports results for the linear and logistic multivariate regression analysis. The dependent variable (D_1) for model 1, the linear model, is the proportion of risk management services outsourced to external providers according to one of eight interval categories. The dependent variable (D_2) for model 2, the logistic model, takes a value of 1 if the company outsources risk management services and zero otherwise.

Table 5.9 - results for the linear and logistic multivariate regression analysis, unrestricted models one and two

(Unrestricted)		Model 1 - D_1 Linear Regression				Model 2 - D_2 Logistic Regression		
N=271		**B**	**t**	**Sig.**	**VIF**	**B**	**Wald**	**Sig.**
Constant		1.50	5.44	0.00		-1.18	4.13	0.04
Skills and Training	-	.02	.22	.82	1.45	.14	.66	.42
Contract Incentives	-	.01	.24	.81	1.19	.04	.12	.73
Staff Turnover	-	.07	.80	.42	1.17	.19	1.11	.29
Research and Development	-	-.16	-2.70	.01	1.22	-.56	5.51	.01
Dynamism	-	-.01	-.09	.93	1.33	.21	1.00	.32
Volume/Demand	-	.83	4.23	.00	1.48	1.28	9.69	.00
Technology	-	-.22	-2.34	.01	1.34	-.38	3.72	.03
Modifications	+	.09	1.14	.25	1.15	.13	.52	.47
Competition	+	-.63	-2.10	.04	1.15	-.98	2.42	.12
Subsidiaries	+	.01	3.27	.00	1.67	.02	5.30	.01
O/S Revenues	+	-.48	-2.06	.04	1.17	-.54	1.17	.28
Restructure	+	.42	1.78	.04	1.21	.77	2.31	.07
Performance Evaluation	-	.00	-.07	.94	1.21	.13	.90	.34
New Management	+	.65	2.20	.03	1.09	1.10	2.81	.05
Frequency	-	-.24	-2.39	.01	1.77	-.77	5.31	.01
Industry	-	.23	1.06	.29	1.43	.43	.87	.35
Proprietary	-	.17	1.15	.25	1.10	.35	1.38	.24
Big4	+	.10	.67	.51	1.16	.65	4.27	.02
Capital Intensity	+	.01	1.20	.23	1.30	.02	3.06	.04
Growth (previous 3 years)	+	.02	.35	.72	1.10	.01	.00	.96
Financial Distress	+	-.06	-.32	.75	1.44	-.56	2.41	.12
Leverage		-.40	-1.85	.07	1.30	-1.32	4.79	.03

Model 1: R square = 0.23; adjusted R square = 0.16; F = 3.40; p = 0.00. Model 2: Chi square 70.02 (22, N = 271); Cox and Snell R square = 0.23; Nagelkerke R square = 0.31; p = 0.00; correctly classifying 74.10 per cent of cases.

5.3.2 Regression analysis – (restricted model)

Given that a number of the predictor and control variables are not significant the models are restricted to strive for scientific parsimony. Five variables derived from the survey (Skills and Training, Contract Incentives, Staff Turnover, Dynamism and Performance Evaluation) and two control variables (Growth and Proprietary) are omitted. The restricted linear model (15 independent variables) is compared with the original (unrestricted model - 22 independent variables) by conducting an F test of their sum of squared residuals. The objective is to test if the unrestricted model is

significantly different thereby enhancing the explanatory power of the regression analysis. Results ($F(7, 249) = 0.38$, $p = 0.89$) indicate there is no significant difference between the unrestricted and the restricted model. In the interests of parsimony the restricted version is selected for linear (model 3) and logistic (model 4) regression analysis and results are reported in table 5.10 on page 115. The models are specified as follows:

$$DV_{1,2} = \beta_0 + \beta_1 \text{Research and Development} + \beta_2 \text{Volume/Demand} + \beta_3 \text{Technology} + \beta_4 \text{Modifications} + \beta_5 \text{Competition} + \beta_6 \text{Subsidiaries} + \beta_7 \text{Overseas Revenues} + \beta_8 \text{Restructure} + \beta_9 \text{New Management} + \beta_{10} \text{Frequency} + \beta_{11} \text{Industry} + \beta_{12} \text{Big4} + \beta_{13} \text{CapitalIntensity} + \beta_{14} \text{Financial Distress} + \beta_{15} \text{Leverage} + e$$

Where

DV_1 = the proportion of risk management services outsourced by category where 0=0%; 1=1-10%; 2=11-25%; 3=26-49%; 4=50-74%; 5=74-90%; 6=90-99%; 7=100%

DV_2 = a dichotomous variable for outsourcing of risk management services; 1 if any risk management services are outsourced, 0 otherwise.

Research and Development = expenditure on research and development as a proportion of operating revenues, standardised and mean centred. A higher proportion indicates greater asset specificity for risk management activities.

Volume/Demand = the variance (standard deviation) in sales over the past three years, standardised and mean centred. A higher variance indicates greater environmental uncertainty.

Technology = the rate of technological change in a company's industry from the standardised mean centred score for survey item 19. A higher score indicates a higher rate of technological change.

Modifications = the extent of modifications/adoptions required for risk management activities to suit different divisions/departments from the standardised mean centred score for survey item 17. A higher score indicates greater environmental uncertainty due to diversity.

Competition = the degree of competition in the industry sub sector calculated as the Herfindahl-Hirschman Index, rescaled, standardised and mean centred. A higher score indicates greater environmental uncertainty due to a more competitive environment.

Subsidiaries = the number of subsidiaries, standardised and mean centred. A higher number indicates greater environmental uncertainty.

Overseas Revenues = the proportion of total revenue from overseas sales, standardised and mean centred. A higher proportion indicates greater environmental uncertainty.

Restructure = equals 1 if the company has had any restructures, acquisitions or mergers in the past 3 years and 0 otherwise. A value of one indicates greater environmental uncertainty.

New Management = equals 1 if the CEO changed in the period 2008-2009, 0 otherwise. A value of one indicates greater behavioural uncertainty for new management with regard to existing staff.

Frequency = the mean centred average of the standardised scores for the number of employees, total revenue and total assets. A higher score indicates more frequent risk transactions.

Industry = control variable for industry knowledge transfer costs measured by a categorical variable where 0 equals low; 0.5 equals medium and 1equals high. A higher value indicates greater industry knowledge transfer costs.

Big4 = a dichotomous variable where 1 equals external supplier of risk management services and/or external auditor is a Big4 accounting company, 0 otherwise.

Capital Intensity = the ratio of fixed assets to operating revenue, standardised and mean centred.

Financial Distress = a dichotomous variable which equals 1 if the company makes a loss in two of three previous years, 0 otherwise.

Leverage = total liabilities divided by total assets, standardised and mean centred.

Table 5.10 - results for the linear and logistic multivariate regression analysis, restricted models three and four

(Restricted)		Model 3 - D_1 Linear Regression				Model 4 - D_2 Logistic Regression		
N=271		**B**	**t**	**Sig.**	**VIF**	**B**	**Wald**	**Sig.**
Constant		1.71	8.10	0.00		-0.62	2.04	0.15
Research and Development	-	-.17	-2.76	.01	1.21	-.53	5.54	.01
Volume/Demand	-	.83	4.36	.00	1.41	1.32	10.84	.00
Technology	-	-.21	-2.52	.01	1.11	-.26	2.11	.08
Modifications	+	.10	1.24	.22	1.06	.18	1.17	.28
Competition	+	-.63	-2.15	.03	1.13	-.96	2.53	.11
Subsidiaries	+	.01	3.41	.00	1.64	.02	5.72	.01
O/S Revenues	+	-.49	-2.17	.03	1.13	-.65	1.84	.17
Restructure	+	.41	1.77	.02	1.15	.70	2.11	.08
New Management	+	.71	2.44	.01	1.05	1.30	4.25	.02
Frequency	-	-.23	-2.35	.01	1.74	-.70	4.67	.02
Industry	-	.21	.99	.32	1.41	.43	.92	.34
Big4	+	.11	.75	.45	1.14	.59	3.80	.05
Capital Intensity	+	.01	1.19	.24	1.22	.02	2.75	.05
Financial Distress	+	-.10	-.62	.53	1.35	-.75	4.61	.03
Leverage		-.45	-2.12	.03	1.25	-1.44	5.90	.02

Model 3: R square = 0.22; adjusted R square = 0.18; F = 4.90; p = 0.00. Model 4: Chi square = 63.63 (15, N = 271); Cox and Snell R square = 0.21; Nagelkerke R square = 0.28; p = 0.00; 69.00 per cent correctly classified.

5.3.2.1 Results of linear regression – model 3 (restricted)

Recall, TCE predicts as the specificity of human assets involved in the risk management function rises companies are more likely to conduct activities in house rather than outsource. Thus a negative hypothesised relation is predicted between asset specificity and the dependent variable, the proportion of risk management activities outsourced (D_1).

Model three provides support for hypothesis 1; that companies with more transaction-specific human assets outsource less risk management activities than those with less transaction-specific human assets when research and development is used as a proxy for asset specificity. Results indicate a significant negative relation between research and development and the proportion of risk management activities outsourced (t = -2.76, p = 0.01). Recall, a number of studies proposes expenditure on research and development is a proxy for asset specificity (Coff, 2003; Cohen and Levinthal, 1990;

Gatignon and Anderson, 1988; Helfat, 1994; Levy, 1985). Research and development relies on transaction specific inputs from human capital (Levy, 1985) and involves learning which is cumulative, has company specific characteristics and elements which impede imitation (Helfat, 1994).

The variables constructed from the survey questionnaire measuring the three dimensions of asset specificity, company specific skills and training, contractual characteristics and staff turnover, are omitted from the restricted model because they are not significant. These results are in contrast to many studies that find asset specificity measured by these characteristics to be a significant predicator of governance choice for sourcing internal audit (Speklé et al., 2007; Widener and Selto, 1999) and in the fields of marketing and information technology research (Anderson and Coughlan, 1987; Anderson and Schmittlein, 1984; Aubert et al., 1996b; John and Weitz, 1988; Klein et al., 1990). However, a number of other studies find no support for human asset specificity as an indicator of governance choice when exploring the determinants of the outsourcing decision for information technology (Murray and Kotabe, 1999; Nam et al., 1996).

Hypothesis 2a predicts companies with more uncertainty associated with volume/demand outsource less risk management activities. However, results from model three suggest the opposite because a significant positive relation exists between variance in sales and the proportion of risk management activities outsourced ($t = 4.36$, $p = 0.00$). This is in contrast to other studies that find outsourcing is related to lower variations in sales (Artz and Brush, 2000; Levy, 1985). These conflicting results could be due to this study's Australian setting. Prior studies conducted overseas have examined generally much larger companies and/or single industry groups. It is suggested smaller companies that experience uncertainty due to a high variability in sales lack the certainty of consistent revenue streams. As a result they are less likely to commit the financial resources to establishing an internal risk management function and are more likely to outsource when required.

Support is found for hypothesis 2a in model three with evidence of increased environmental uncertainty due to technological change is related to less outsourcing of risk management activities ($t = -2.52$, $p = 0.01$). These results provide support for the

existing literature. Recall Afuah (2001) finds evidence vertical integration provides a more durable base from which adaption to competence destroying technological change can be made when measured by technical performance. Despite evidence to the contrary, Walker and Weber (1984) propose the costs of managing and coordinating activities between internal demands and external suppliers increase more than coordinating activities internally as the frequency of technological change increases making vertical integration the least costly option.

This study measures five different aspects of diversity with mixed and conflicting results. Recall that hypothesis 2b predicts that companies outsource more risk management activities as environmental uncertainty due to diversity increases. This is because of a requirement for flexible information flow which can be obtained more cost effectively from external suppliers. In support of hypothesis 2b, results from model three provide evidence that companies with more subsidiaries ($t = 3.41$, $p = 0.00$) and companies that have had a restructure, acquisition or merger in the last 3 years ($t = 1.77$, $p = 0.02$) outsource more risk management activities.

These results are in contrast to the environmental diversity measures of level of industry competition, measured by the rescaled Hirschman-Herfindahl Index, and revenues from overseas operations which are significant in the opposite direction predicted therefore providing no support for hypothesis 2b. Model three provides evidence that as industry competition rises companies outsource less risk management activities ($t = -2.15$, $p = 0.03$). These results are in contrast to existing studies (Levy, 1985). It is suggested that as competition within an industry sector rises concern for behavioural uncertainty and opportunism of external suppliers likely to arise from exposure to risk management policies and procedures is more relevant for companies. Therefore industry competition measured by the Herfindahl-Hirschman Index could be viewed as a measure of behavioural uncertainty for risk management activities.

Results from model three suggest that as the proportion of overseas revenue from operations rises companies outsource less risk management activities ($t = -2.17$, $p = 0.03$), which is also in contradiction to hypothesised theoretical predictions for environmental diversity. A possible explanation is that companies may not want to relinquish control over aspects of risk management related to their foreign operations to

external suppliers given the regulatory compliance and strategic nature of risk management and thus prefer to assemble the resources internally. There is no support for the proposition companies with more uncertainty measured by the degree of modifications or adaptions required to suit different departments or divisions in risk management processes outsource more risk management activities.

There is no support for hypothesis 3a that higher behavioural uncertainty relating to external suppliers leads to less outsourcing of risk management activities. Results for the variable measuring performance evaluation from model three are not significant. This is in contrast to Aubert et al., (1996b) but support results from prior governance studies (Nicholson, Jones, and Espenlaub, 2006; Speklé et al., 2007; Widener and Selto, 1999). Speklé et al., (2007) argue against behavioural uncertainly as a factor in governance choice for internal audit. They propose that when specialist expert knowledge is involved senior management do not possess sufficient expertise to assess the quality of performance and initiate corrective actions and therefore there are no benefits from internal monitoring.

In contrast, model three provides support for hypothesis 3b that behavioural uncertainty impacts the governance choice for risk management activities. Results indicate companies that have had a change of CEO in the past two years outsource more risk management activities ($t = 2.44$, $p = 0.01$). This supports Kent (2011), who proposes that established management has a relative advantage in the performance evaluation of internal employees compared to new management who are unfamiliar with their new employees' knowledge, expertise and potential for opportunistic behaviour. This increases relative behavioural uncertainty in evaluating internal employees and hence a new CEO entering the organisation seeks the advice of independent advisers outside the organisation rather than internal advisers. This is likely to be particularly relevant for providers of risk management activities within the company. Ouchi (1979) notes where human assets assume a prominent role such as risk management, internal (behavioural) uncertainty is likely to assume considerable importance supporting the decision for new management to seek independent advice.

TCE predicts a greater volume of transactions leads to internal specialisation of the risk management function (Klein, 1989). The provision of risk management services

in house requires companies to maintain staff with expertise which is an investment carrying significant economies of scale (Speklé et al., 2007). Support is found in model three for hypothesis 4 with evidence that increased transaction frequency, proxied by company size, is associated with less outsourcing of risk management activities ($t = -2.35$, $p = 0.01$). This result is consistent with prior research and TCE predictions (Anderson and Schmittlein, 1984; John and Weitz, 1988; Klein et al., 1990; Speklé et al., 2007; Widener and Selto, 1999).

Recall that this study proposes a number of other factors are likely to effect the sourcing decision for risk management activities and therefore includes a number of control variables in the statistical analysis. Model three provides evidence that as leverage increases companies outsource less risk management activities ($t = -2.12$, $p = 0.03$). The literature identifies a number of financial factors outside of the TCE framework that have the capacity to restrain internalisation of the risk management function. However no support is found for capital intensity and financial distress as financial restraining factors that significantly impact the proportion of risk management activities outsourced. In addition, the control variables for industry knowledge, transfer costs and quality of external supply (measured by whether the external auditor or supplier of risk management activities is a Big4 accounting company) are not significant predictors of the proportion of risk management activities outsourced in model 3.

5.3.2.2 Results of logistic regression – model 4 (restricted)

Model four is a logistic regression modelling the outsourcing of risk management activities as a discrete binary choice, yes or no. Results are qualitatively similar to model three which is the linear regression modelling the proportion of risk management activities outsourced.

Support is provided for hypothesis 1 with evidence that the specificity of human assets involved in the risk management function, proxied by expenditure on research and development, is associated with the decision to source the risk management function internally ($wald = 5.54$, $p = 0.01$).

Results from model four support model three in that environmental uncertainty in volume/demand measured as variance in sales is significantly associated with the decision to outsource risk management activities (wald = 10.84, p = 0.00). These results support Anderson and Schmittlein (1984) who find evidence variance in sales is associated with the decision to outsource to manufacturers' representatives as opposed to the use of an internal direct sales force. Partial support is found for environmental uncertainty due technological change as a factor in the decision to internalise risk management activities (wald = 2.11, p = 0.08)[49].

Recall hypothesis 2b predicts that companies outsource more risk management activities as environmental uncertainty due to diversity of the environment increases. Support is provided from model four with more subsidiaries associated and whether the company has had a restructure, acquisition or merger in the past three years with the decision to outsource (wald = 5.72, p = 0.01 and wald = 2.11, p = 0.08). Modifications required for risk management processes, competition and proportion of overseas revenue are not significant indictors of the decision to outsource risk management activities or not in model four.

No support is found for hypothesis 3a that the behavioural uncertainty associated with the performance evaluation of external suppliers of risk management activities is a factor in governance choice. However support is found for hypothesis 3b that behavioural uncertainty impacts the governance choice for risk management activities for new management. Results from model four indicate a significant positive association between the decision to outsource and companies that have had a change of CEO in the past two years (wald = 4.25, p = 0.02). Hypothesis 4 is supported with model four providing evidence the decision not to outsource is associated with transaction frequency (wald = 4.67, p = 0.02).

Results from model four indicate companies using a Big4 accounting company for their external audit and/or risk management activities are significantly associated with the decision to outsource risk management activities (wald = 3.80, p = 0.05). This is consistent with the argument companies are more likely to outsource to external

[49] Prior to the restrictions results from the logistic regression are significant at p<.05 reported in table 5.10.

suppliers if they have a reputation for quality regardless of other factors. It is argued capital intensity indicates rising resource commitments leading to less funds for companies to establish functions internally regardless of other factors such as asset specificity. Results from model four support this proposition indicating capital intensive companies are associated with the decision to outsource (wald = 2.75, p = 0.05). Contrary to theoretical propositions, results from model four indicate companies experiencing financial distress do not outsource risk management activities (wald = 4.61; p = 0.03). Leverage is also associated with the decision not to outsource (wald = 5.90, p = 0.02) in model four. It is proposed financial distress and leverage are factors restricting the financial resources available and are likely to limit the magnitude of risk management activities conducted internally and by external consultants. Results from model four indicate knowledge intensity associated with an industry sector is not a significant factor in the discrete decision to outsource risk management activities.

5.4 STATISTICAL TESTS OF THE HYPOTHESES (SUBSAMPLE OF OUTSOURCING COMPANIES)

A subsample of the 125 ASX listed companies reporting outsourcing of risk management activities is analysed independently. The three items in the survey specifically relating to those companies outsourcing risk management activities are included as additional independent variables in the regression analyses. Two items measure aspects of asset specificity. Item 5 measures the average contract length with external providers of risk management activities, assuming transactions requiring specific investments require a mechanism to protect the supplier. One of the mechanisms is a longer contract duration. Item 6 is a dichotomous variable to measure if training is provided to external suppliers of risk management activities. The third, item 16, relates to the TCE dimension behavioural uncertainty, measuring the degree of perceived difficulty in evaluating the quality of outsourced risk management activities.

5.4.1 Regression analysis

Two additional models are tested using only the companies that outsourced some of their risk management function. For model five, in the linear regression, the dependent variable for the sub sample analysis is operationalised as the proportion of

risk management activities outsourced to external providers according to one of seven categories (D_1). The dependent variable in model six, the logistic regression, is a binary variable (D_3) measuring high or low outsourcing. High is more than 25 per cent of risk management activities outsourced and given a value of one and low is 25 per cent or less outsourced and is given a value of zero. The initial model is specified as follows and results are reported in table 5.11 on page 125.

$$DV1_{1,3} = \beta_0 + \beta_1 \text{Training Externals} + \beta_2 \text{Contract Duration} + \beta_3 \text{Skills and Training} + \beta_4 \text{Contract Incentives} + \beta_5 \text{Staff Turnover} + \beta_6 \text{Research and Development} + \beta_7 \text{Dynamism} + \beta_8 \text{Volume/Demand} + \beta_9 \text{Technology} + \beta_{10} \text{Modifications} + \beta_{11} \text{Competition} + \beta_{12} \text{Subsidiaries} + \beta_{13} \text{Overseas Revenues} + \beta_{14} \text{Restructure} + \beta_{15} \text{Performance Evaluation} + \beta_{16} \text{Performance Quality} + \beta_{17} \text{New Management} + \beta_{18} \text{Frequency} + \beta_{19} \text{Industry} + \beta_{20} \text{Proprietary} + \beta_{21} \text{Big4} + \beta_{22} \text{Capital Intensity} + \beta_{23} \text{Growth} + \beta_{24} \text{Financial Distress} \beta_{25} \text{Leverage} + e$$

Where:

DV_1 = the proportion of risk management services outsourced by category where 1=1-10%; 2=11-25%; 3=26-49%; 4=50-74%; 5=74-90%; 6=90-99%; 7=100%

DV_3 = an outsourcing variable for risk management services where 1 equals high with more than 25 per cent of risk management activities outsourced and 0 equals low with 25 per cent or less outsourced.

Training Externals = a dichotomous variable measured as 1 = training provided to external suppliers of risk management activities, 0 otherwise.

Contract Duration = a categorical variable for the average length of contract with an external provider of risk management services, 1 equals less than 1 year, 2 equals 1 to 3 years and 3 equals more than 3 years.

Skills and Training = the depth of company specific skills, knowledge and training required computed from the standardised mean centred score for four survey items 7,8,9 and 11. A higher score indicates greater asset specificity for risk management activities.

Contract Incentives = the use of contract incentives to promote staff retention in risk management activities from the standardised mean centred score for survey item 12. A higher score indicates greater asset specificity for risk management activities.

Staff Turnover = staff turnover in risk management relative to other service functions from the standardised mean centred score for survey item 15. A higher score indicates greater asset specificity for risk management activities.

Research and Development = expenditure on research and development as a proportion of operating revenues, standardised and mean centred. A higher proportion indicates greater asset specificity for risk management activities.

Dynamism = the perceived dynamism of the external environment facing the company from the standardised mean centred score for survey item 18. A higher score indicates greater environmental uncertainty.

Volume/Demand = the variance (standard deviation) in sales over the past three years, standardised and mean centred. A higher variance indicates greater environmental uncertainty.

Technology = the rate of technological change in a company's industry from the standardised mean centred score for survey item 19. A higher score indicates a higher rate of technological change.

Modifications = the extent of modifications/adoptions required for risk management activities to suit different divisions/departments from the standardised mean centred score for survey item 17. A higher score indicates greater environmental uncertainty due to diversity.

Competition = the degree of competition in the industry sub sector calculated as the Herfindahl-Hirschman Index, rescaled, standardised and mean centred. A higher score indicates greater environmental uncertainty due to a more competitive environment.

Subsidiaries = the number of subsidiaries, standardised and mean centred. A higher number indicates greater environmental uncertainty.

Overseas Revenues = the proportion of total revenue from overseas sales, standardised and mean centred. A higher proportion indicates greater environmental uncertainty.

Restructure = equals 1 if the company has had any restructures, acquisitions or mergers in the past 3 years, 0 otherwise. A value of one indicates greater environmental uncertainty.

Performance Evaluation = the degree of perceived difficulty in measuring performance of any existing or potential external consultants engaged for risk management activities from the standardised mean centred score for survey item 10. A higher score indicates greater behavioural uncertainty.

Performance Quality = the degree of perceived difficulty in evaluating the quality of outsourced risk management activities from the standardised mean centred score for survey item 16. A higher score indicates greater behavioural uncertainty.

New Management = equals 1 if the CEO changed in the period 2008-2009, 0 otherwise. A value of one indicates greater behavioural uncertainty for new management with regard to existing staff.

Frequency = the mean centred average of the standardised scores for the number of employees, total revenue and total assets. A higher score indicates more frequent risk transactions.

Industry = control variable for industry knowledge transfer costs measured by a categorical variable where 0 equals low, 0.5 equals medium and 1equals high. A higher value indicates greater industry knowledge transfer costs.

Proprietary = a categorical variable where 0 equals none, 1 equals less than 50 per cent and 2 equals more than 50 per cent from survey item 20.

Big4 = a dichotomous variable where 1 equals external supplier of risk management services and/or external auditor is a Big4 accounting company, 0 otherwise.

Capital Intensity = the ratio of fixed assets to operating revenue, standardised and mean centred.

Growth = the percentage change in total assets over previous three years, standardised and mean centred.

Financial Distress = a dichotomous variable which equals 1 if the company makes a loss in two of three previous years, 0 otherwise.

Leverage = total liabilities divided by total assets, standardised and mean centred.

Table 5.11- results for the linear and logistic multivariate regression analysis for subsample of companies outsourcing risk management activities, unrestricted models

		Model 5 - D_1 Linear Regression				Model 6 - D_3 Logistic Regression		
N=125 (unrestricted)		**B**	**t**	**Sig.**	**VIF**	**B**	**Wald**	**Sig.**
(Constant)		2.87	6.02	.00		-40.27	2.56	.11
Training Externals	-	.25	1.84	.07	1.32	2.29	8.55	.00
Contract Duration	-	.54	2.14	.04	1.37	7.12	7.91	.00
Skills and Training	-	-.08	-.74	.46	1.79	.08	.02	.89
Contract Incentives	-	.02	.34	.73	1.30	-.27	1.01	.32
Staff Turnover	-	-.09	-.74	.46	1.41	-1.02	3.18	.04
Research and Development	-	-.14	-.79	.43	1.38	-141.68	1.90	.08
Dynamism	-	-.19	-1.40	.08	1.33	-1.79	4.99	.02
Volume/Demand	-	.53	2.20	.03	2.06	4.54	9.72	.00
Technology	-	-.22	-1.90	.03	1.29	-1.72	6.18	.01
Modifications	+	.15	1.25	.22	1.34	.13	.06	.81
Competition	+	-1.01	-2.81	.01	1.24	-5.49	7.75	.01
Subsidiaries	+	.01	2.35	.01	3.87	.10	6.42	.01
Overseas Revenues	+	-.60	-1.73	.09	1.69	-3.05	3.73	.05
Restructure	+	.56	1.78	.04	1.59	4.27	4.55	.02
Performance Evaluation	-	-.03	-.40	.69	1.42	-.11	.08	.77
Performance Quality	-	-.15	-1.15	.25	1.30	-.03	.00	.95
New Management	-	.02	.06	.95	1.30	.16	.02	.90
Frequency	-	-.51	-1.85	.04	4.00	-8.40	6.34	.01
Industry	-	.17	.55	.58	1.78	1.06	.45	.50
Proprietary	-	.05	.31	.76	1.20	1.43	3.01	.08
Big4	+	-.18	-.95	.35	1.24	-1.28	1.89	.17
Capital Intensity	+	.00	-.83	.41	1.22	-.02	2.61	.06
Growth (previous 3 years)	+	.05	.67	.51	1.32	.40	1.49	.22
Financial Distress	+	.26	1.09	.28	2.00	1.92	2.28	.07
Leverage		-.26	-.69	.49	1.58	-3.17	1.69	.19

Model 5: R square = 0.32, adjusted R square = 0.15; F = 1.88, p = .02. Model 6: Chi square 84.85 (25, N = 125), p = 0.00, Cox and Snell R square of 0.50, a Nagelkerke R square of 0.71 correctly classifying 83.00 per cent of cases.

5.4.2 Regression analysis – restricted model

Given that a number of the predictor and control variables in models five and six are not significant, the models are restricted to strive for scientific parsimony. Five variables are omitted (Skills and Training, Contract Incentives, Performance Evaluation,

New Management and Industry). The restricted linear model (20 independent variables) is compared with the original (unrestricted model - 25 independent variables) by conducting an F test of their sum of squared residuals. The objective is to test if the unrestricted model is significantly different thereby enhancing the explanatory power of the regression analysis. Results ($F(5, 100) = 0.26$, $p = 0.96$) indicate there is no significant difference between the unrestricted and the restricted model. In the interests of parsimony the restricted version is selected for linear (model 7) and logistic (model 8) regression analysis and results are reported in table 5.12 on page 129. The models are specified as follows:

$$DV1_{1,3} = \beta_0 + \beta_1 \text{Training Externals} + \beta_2 \text{Contract Duration} + \beta_3 \text{Staff Turnover} + \beta_4 \text{Research and Development} + \beta_5 \text{Dynamism} + \beta_6 \text{Volume/Demand} + \beta_7 \text{Technology} + \beta_8 \text{Modifications} + \beta_9 \text{Competition} + \beta_{10} \text{Subsidiaries} + \beta_{11} \text{Overseas Revenues} + \beta_{12} \text{Restructure} + \beta_{13} \text{Performance Quality} + \beta_{14} \text{Frequency} + \beta_{15} \text{Proprietary} + \beta_{16} \text{Big4} + \beta_{17} \text{Capital Intensity} + \beta_{18} \text{Growth} + \beta_{19} \text{Financial Distress} + \beta_{20} \text{Leverage} + e$$

Where:

DV_1 = the proportion of risk management services outsourced by category where 1=1-10%; 2=11-25%; 3=26-49%; 4=50-74%; 5=74-90%; 6=90-99%; 7=100%

DV_3 = an outsourcing variable for risk management services where 1 equals high with more than 25 per cent of risk management activities outsourced and 0 equals low with 25 per cent or less outsourced.

Training Externals = a dichotomous variable measured as 1 = training provided to external suppliers of risk management activities, 0 otherwise.

Contract Duration = a categorical variable for the average length of contract with an external provider of risk management services, 1 equals less than 1 year, 2 equals 1 to 3 years and 3 equals more than 3 years.

Staff Turnover = staff turnover in risk management relative to other service functions from the standardised mean centred score for survey item 15. A higher score indicates greater asset specificity for risk management activities.

Research and Development = expenditure on research and development as a proportion of operating revenues, standardised and mean centred. A higher proportion indicates greater asset specificity for risk management activities.

Dynamism = the perceived dynamism of the external environment facing the company from the standardised mean centred score for survey item 18. A higher score indicates greater environmental uncertainty.

Volume/Demand = the variance (standard deviation) in sales over the past three years, standardised and mean centred. A higher variance indicates greater environmental uncertainty.

Technology = the rate of technological change in a company's industry from the standardised mean centred score for survey item 19. A higher score indicates a higher rate of technological change.

Modifications = the extent of modifications/adoptions required for risk management activities to suit different divisions/departments from the standardised mean centred score for survey item 17. A higher score indicates greater environmental uncertainty due to diversity.

Competition = the degree of competition in the industry sub sector calculated as the Herfindahl-Hirschman Index, rescaled, standardised and mean centred. A higher score indicates greater environmental uncertainty due to a more competitive environment.

Subsidiaries = the number of subsidiaries, standardised and mean centred. A higher number indicates greater environmental uncertainty.

Overseas Revenues = the proportion of total revenue from overseas sales, standardised and mean centred. A higher proportion indicates greater environmental uncertainty.

Restructure = equals 1 if the company has had any restructures, acquisitions or mergers in the past 3 years, 0 otherwise. A value of one indicates greater environmental uncertainty.

Performance Quality = the degree of perceived difficulty in evaluating the quality of outsourced risk management activities from the standardised mean centred score for survey item 16. A higher score indicates greater behavioural uncertainty.

Frequency = the mean centred average of the standardised scores for the number of employees, total revenue and total assets. A higher score indicates more frequent risk transactions.

Proprietary = a categorical variable where 0 equals none, 1 equals less than 50 per cent and 2 equals more than 50 per cent from survey item 20.

Big4 = a dichotomous variable where 1 equals external supplier of risk management services and/or external auditor is a Big4 accounting company, 0 otherwise.

Capital Intensity = the ratio of fixed assets to operating revenue, standardised and mean centred.

Growth = the percentage change in total assets over previous three years, standardised and mean centred.

Financial Distress = a dichotomous variable which equals 1 if the company makes a loss in two of three previous years, 0 otherwise.

Leverage = total liabilities divided by total assets, standardised and mean centred.

Table 5.12- results for the linear and logistic multivariate regression analysis for subsample of companies outsourcing risk management activities, restricted models

(Restricted)		Model 7 - D_1 Linear Regression				Model 8 - D_3 Logistic Regression		
N=125		**B**	**t**	**Sig.**	**VIF**	**B**	**Wald**	**Sig.**
Constant		2.98	6.79	.00		-27.68	1.64	.20
Training Externals	-	.26	2.06	.04	1.24	2.08	9.44	.00
Contract Duration	-	.46	1.97	.05	1.21	6.08	9.35	.00
Staff Turnover	-	-.10	-.97	.33	1.28	-.86	2.71	.05
Research and Development	-	-.16	-.93	.35	1.33	-92.57	1.06	.30
Dynamism	-	-.21	-1.58	.06	1.26	-1.86	6.76	.01
Volume/Demand	-	.60	2.63	.01	1.91	4.52	11.94	.00
Technology	-	-.23	-2.08	.02	1.24	-1.58	7.01	.01
Modifications	+	.14	1.22	.23	1.26	.19	.16	.69
Competition	+	-.98	-2.81	.01	1.21	-5.11	8.41	.00
Subsidiaries	+	.01	2.46	.01	3.72	.09	8.45	.00
Overseas Revenues	+	-.57	-1.78	.08	1.47	-2.73	3.24	.07
Restructure	+	.64	2.25	.03	1.32	4.25	6.58	.01
Performance Quality	-	-.13	-1.07	.29	1.23	.03	.00	.95
Frequency	-	-.52	-1.93	.03	3.87	-7.73	7.48	.01
Proprietary	-	.06	.41	.69	1.15	1.26	3.34	.07
Big4	+	-.16	-.92	.36	1.18	-1.37	2.48	.12
Capital Intensity	+	.00	-.92	.36	1.19	-.02	2.64	.10
Growth (previous 3 years)	+	.05	.70	.48	1.25	.35	1.38	.24
Financial Distress	+	.26	1.23	.22	1.70	2.44	4.95	.03
Leverage		-.33	-.96	.34	1.37	-2.92	2.66	.10

Model 7: R squared = 0.32; adjusted R square = 0.18; F = 2.37; p = 0.00. Model 8: Chi square = 82.76 (20, N = 125); Cox and Snell R square = 0.49; Nagelkerke R square = 0.69, p = 0.00, correctly classifying 84.60 per cent of cases.

5.4.2.1 Results of linear regression for the subsample of outsourcing companies – model 7 (restricted)

Model seven is a linear regression with the dependent variable operationalised as the proportion of risk management activities outsourced to external providers according to one of seven categories. Recall that hypothesis 1 predicts that with increasing human asset specificity of the risk management function companies outsource less. Results from model seven provide no support for this hypothesis, with expenditure on research and development and staff turnover in risk management relative to other service functions not significant for the proportion of risk management activities outsourced in the subsample group of 125 companies. However, model seven does provide evidence

that companies are more likely to provide training (t = 2.06, p = 0.04) and have longer contract durations with their external suppliers (t = 1.97, p = 0.05) as the proportion of risk management services provided rises. This positive relation is in contradiction to the theoretical predictions of TCE that these characteristics are indicators of asset specificity.

There is marginal support from model seven for hypothesis 2a that environmental uncertainly due to volume/demand is associated with less outsourcing of risk management activities. The variable perceived dynamism of the external economic environment is marginally significant for the sub sample of outsourcing companies (t = -1.58, p = 0.06). Variation in sales as a measure of volume/demand uncertainty is significant in model seven as leading to more outsourcing (t = -2.63, p = 0.01), replicating results from model three. Support is found for hypothesis 2b that technological uncertainty is associated with less outsourcing of risk management activities for the subsample of 125 companies from model seven (t = -2.08, p = 0.02).

Further evidence is provided from model seven to support results from model three for environmental uncertainty due to the diversity of the environment as a factor influencing the proportion of risk management activities outsourced. Support is found for hypothesis 2b that environmental diversity leads to more outsourcing when measured by the number of subsidiaries in model seven (t = 2.46; p = 0.01) and if the company has had a restructure, acquisition or merger in the past three years (t = 2.25; p = 0.03). However, again contrary to the hypothesised relation for environmental diversity, model seven finds significant evidence that as the level of industry competition rises and the proportion of revenues from overseas increases companies outsource less risk management activities (t = -2.81, p = 0.01 and t = -1.78, p = 0.08). The degree of modifications required to suit different departments or divisions is not a significant indicator of the proportion outsourced in model seven.

There is no support from model seven for hypotheses 3a and 3b that behavioural uncertainty impacts the proportion of risk management activities outsourced in the subsample of outsourcing companies.

Model seven provides support for hypothesis 4 with evidence that as transaction frequency increases companies outsource less (t = -1.93; p = 0.03) supporting results from model three for the whole sample.

Recall that the restricted models analysing the subsample of companies outsourcing risk management activities operationalises six control variables as alternative explanations for the proportion outsourced. None of these variables are significant indicators of the proportion of risk management activities outsourced for the subsample.

5.4.2.2 Results of logistic regression for the subsample of outsourcing companies model 8 (restricted)

Model eight is a logistic regression where the dependent variable is binary, measuring high or low outsourcing where high is more than 25 per cent of risk management activities outsourced and low is 25 per cent or less outsourced. Model eight provides support for hypothesis 1 with lower staff turnover in risk management relative to other service functions being associated with low outsourcing of risk management activities (wald = 2.71; p = 0.05). Model eight also indicates companies associated with higher outsourcing of their risk management activities provide training to their external suppliers (wald = 9.44, p = 0.00) and have longer contracts (wald = 9.35, p = 0.00) replicating the results from model seven. Results from model eight provide no support for expenditure on research and development as associated with low outsourcing of risk management activities in the subsample group of 125 companies.

Support is found for hypothesis 2a with outsourcing companies indicating uncertainty due to volume/demand, measured by the survey variable perceived dynamism of the external environment facing the company and technological change, is associated with lower outsourcing (wald = 6.76, p = 0.01; wald = 7.01; p = 0.01). Model eight reports significant results in the opposite predicted direction for environmental uncertainty due to volume/demand supporting previous analysis conducted in this study. Companies characterised by higher variation in sales are associated with higher outsourcing of risk management activities (wald = 11.94; p = 0.00).

Mixed and conflicting results occur for model eight for hypothesis 2b which predicts higher environmental diversity is associated with higher outsourcing of risk management activities. In support of hypothesis 2b the number of subsidiaries and whether the company has had a recent restructuring, acquisitions or mergers are associated with high outsourcing (wald = 8.45, p = 0.00 and wald = 6.58, p = 0.01). Results from model eight for environmental diversity, measured by competition and proportion of overseas revenues, provide further evidence that the level of industry competition is significantly associated with low outsourcing (wald = 8.41, p = 0.00 and wald = 3.24, p = 0.07). The degree of modifications required to suit different departments or divisions is not a significant indicator of the proportion outsourced in model eight.

No support is provided for hypothesis 3a which proposes that behavioural uncertainty associated with the provision of risk management services from external suppliers leads to less outsourcing. The variable measuring the quality of outsourced risk management activities is not significant in model eight. The measure of behavioural uncertainty associated with new management was omitted from the restricted model for the subsample due to lack of significance which could be due to only 11 companies in the subsample having had a change in CEO in the past two years.

Hypothesis 4 is supported with transaction frequency associated with low outsourcing of risk management activities in the sub sample of outsourcing companies (wald = 7.48, p = 0.01).

Significant results from model eight indicate that companies who have experienced a loss in two of the three previous years are associated with higher outsourcing of risk management activities (wald = 4.95, p = 0.03). Capital intensity is marginally associated with lower outsourcing of risk management activities (wald = 2.64, p = 0.10). These results are in contrast to the results for the whole sample from model four which finds financial distress is associated with the decision not to outsource and capital intensity is associated with the decision to outsource. Leverage is marginally associated with lower outsourcing of risk management activities in the sub sample of outsourcing companies (wald = 2.66, p = 0.10). Contrary to theoretical predictions exposure to proprietary information is marginally associated with higher outsourcing of

risk management activities in the sub sample of outsourcing companies (wald = 3.34, p = 0.07). Growth and reputation are not significant indicators in model eight of the decision to outsource more or less risk management activities for the subsample.

5.5 DISCUSSION OF RESULTS

5.5.1 Asset Specificity

In a study of 133 journal articles from 35 journals from 1971 to 1992 Lohtia et al., (1994) argue there is no consistent definition or operationalisation of the construct asset specificity. The authors note prior research has treated asset specificity as a uni-dimensional construct and future operationalisations should consider different dimensions (Lohtia et al., 1994). This study uses a survey questionnaire to operationalise four individual dimensions of asset specificity in order to extend the scope of measurement of the construct. Linear and logistic regression and inclusion of multiplicative interaction terms (discussed in section 5.7) for asset specificity in the analysis is conducted. Significant results are obtained for the archival proxy expenditure on research and development in linear and logistic regression analysis of the whole sample (models three and four) and staff turnover in the logistic regression analysis of the sub sample (model eight). No significant results are found for the two aspects, company specific skills and training and contractual characteristics from analysis of the whole sample of companies, and evidence contrary to theoretical expectations from the subsample of 125 outsourcing companies was found. There are a number of possible explanations.

Recall that the generic technical and professional skills of engineers, doctors, lawyers and accountants are examples of skills which are valuable in a variety of companies or industries (Coff, 1997; Williamson, 1981a). It is likely the deepening of professional skills applied in risk management with company specific knowledge is not sufficient to constitute a degree of asset specificity that influences the governance choice decision. With respondents reporting an average of 92 per cent of staff working in risk management having professional qualifications such as a university degree or equivalent, asset specificity may not be a determining factor for the governance choice for risk management activities.

Results from the analysis of the subsample of companies outsourcing risk management find evidence of a significant positive relation between outsourcing and contract duration and training provision for external suppliers of risk management activities contrary to theoretical expectations. Agency theory also depicts the company as a nexus of contracting relationships which incur transaction costs due to opportunism on the part of the supplier with information asymmetry the core driver (Oviatt, 1988). Drawing on agency theory, it is proposed companies are incurring the bonding and monitoring costs of investing in training and longer contract duration for external providers of risk management activities.

5.5.2 Uncertainty

Recall that this study finds mixed and conflicting significant results for the TCE dimension environmental uncertainty decomposed into the three dimensions of volume/demand, technological and diversity. David and Han (2004) conduct a systematic assessment of empirical support for TCE examining 308 statistical tests from 63 articles. Only 24 per cent of tests for uncertainty were significant in the predicted direction, 60 per cent not significant and 16 per cent significant in the opposite direction predicted.

Widener and Selto (1999) refer to environmental uncertainty as the stability and predictability of internal audit activities as a consequence of business conditions. Finding no support for this dimension, the authors conclude their measure is noisy and lacking reliability and advocate future research strive for better more reliable measures. In their replication of the Widener and Selto (1999) study, Speklé et al., (2007) also find uncertainty is not a predictor of governance choice, proposing environmental uncertainty does not affect the sourcing decision for internal audit. The authors argue that the decision it is not a discrete choice between the two options and companies generally have a combination of in house and external providers. This co-sourcing option provides additional ways to deal with uncertainty which are not captured by the general TCE predictions.

It is suggested the Widener and Selto (1999) study combines conflicting constructs in a single summary measure and therefore results for the underlying

opposing components have cancelled each other out and thus no significant relationship is validated. Examination of the survey questions used in their studies bear out this proposition. It is proposed the four questionnaire items from the Widener and Selto (1999) study used to operationalise the dimension environmental uncertainty are in fact measuring more than a single dimension with conflicting governance outcomes. Table 5.13 below presents the survey items, suggested TCE transactional dimensions and predicted governance choice from the Widener and Selto (1999) study.

Table 5.13 - Survey items from the study by Widener and Selto (1999)

Widener and Selto 1999 Survey[50] Questions measuring 'Environmental Uncertainty'	Proposed Dimension	Hypothesised Governance Mode
In fiscal 1996 (2003) how much variation in business activities was there among auditees?	Diversity	Outsource
In fiscal 1996, were there changes in the business organization (such as acquisitions, divestitures, reorganisations) of your company?	Diversity	Outsource
In fiscal 1996, (2003) how predictable was the need for internal audit services?	Volume/demand	In-house[51]
In fiscal 1996, were there changes (turnover) in auditee personnel within your company?	Asset specificity	In-house

5.5.3 Frequency

Researchers in TCE observe that frequency has not received the equivalent academic scrutiny of asset specificity and uncertainty (David and Han, 2004; Geyskens et al., 2006; Macher and Richman, 2008; Rindfleisch and Heide, 1997). David and Han (2004), in their systematic assessment of empirical support for TCE, review only 13 tests of frequency compared to 107 for asset specificity and 87 for uncertainty. Geyskens et al., (2006) do not include frequency in their meta analytical study of transaction cost theory due to lack of research. Some empirical studies show no association between transaction frequency and governance mode (Anderson and Schmittlein 1984; Anderson 1985), while other studies find a significant relationship as predicted by TCE (John and Weitz, 1988; Klein et al., 1990; Speklé et al., 2007;

[50] Two of the questions from the Widener and Selto (1999) study where used in the replication questionnaire by Speklé, et al., (2007), marked in parenthesis (2003).
[51] This study hypothesised a negative association between environmental uncertainty due to volume/demand and outsourcing but results provided evidence of the opposite relation.

Widener and Selto, 1999). Described as the most simple to contextualise, representing the volume and value of transactions over time (Williamson, 1979), this study combines measures of company size (totals assets, operating revenues, number of employees) to create a composite proxy variable to measure frequency. In support of TCE theoretical predictions results provide evidence of a negative relation between transaction frequency and outsourcing of risk management activities.

5.6 RESPONSE BIAS

Response bias is the threat that respondents to the survey are not representative of the population (Armstrong and Overton, 1977). The TCE literature identifies a number of potential response biases. This study tests for three types of respondent bias. First, survey respondents are compared to non respondents. Non response bias occurs if those not responding to the survey are systematically different from those responding, thus compromising the generalisablity of the results (Flynn et al., 1990). A useful approach is demographic matching to determine whether differences exist between respondents and non-respondents (Flynn et al., 1990). Second, early versus late respondents are compared on the basis late respondents are very similar to non respondents (Armstrong and Overton, 1977) given they would not have responded if a second set of surveys had not been sent.

Third, a comparison is made between mail and email respondents because a mixed mode of questionnaire administration is used. Whilst email is essentially an electronic version of regular mail with many similarities (Schaefer and Dillman, 1998), researchers have reported a variation in response rates and speed (Sheehan and McMillan, 1999). Schaefer and Dillman (1998) found email administered surveys obtained a slightly higher completion rate compared to the mail counterpart (69 per cent versus 57 per cent) and response time was significantly higher (9 days versus 14 days). Dillman, Phelps, Tortora, Swift, Kohrell, Berck, and Messer (2009) found mail and internet respondents qualitatively the same when comparing mixed modes. Yun and Trumbo (2000) observe no significant influence due to survey mode in their study of multi mode survey techniques, finding the use of multiple modes actually improved representativeness of the sample without biasing results.

This study tests for response bias by comparing the means of respondents with non respondents, early with late respondents and mail with email respondents on the basis of size (total assets, operating revenues and number of employees) and age (number of years listed on the ASX). An independent samples t test is used to test for response bias by comparing the means of size and age variables for the 281 survey respondents[52]. To ensure the assumption of normally distributed data is not violated, additional analysis includes a non parametric Mann Whitney U Test performed to compare medians.

Total assets (natural logarithm), operating revenues (natural logarithm), the number of employees and number of years company has been established are used as demographic variables for comparison following existing research in the field (Anderson, 1985, 1988; Anderson and Schmittlein, 1984; Aubert et al., 1996b, 2003; Gilley and Rasheed, 2000b; Speklé et al., 2007; Widener, 2004; Widener and Selto, 1999). Discussion and results are presented below indicating overall response bias does not threaten the reliability of the results.

5.6.1 Non-response bias

Respondents are compared with the non respondents to the survey request using available data for the comparison variables from the population of 1811 companies surveyed. The comparison variables for non respondent companies are total assets and operating revenues (961 observations), number of employees (645 observations) and number of years operating (505 observations) measured as number of years listed on the ASX. Results are reported in the table 5.14 below:

[52] Ten companies were excluded from the regression analysis due to missing data and/or identification as outliers. Results from tests for response bias for the reduced sample are qualitatively the same.

Table 5.14 – Results of statistical tests for non respondent bias

Variable	Category	N	Mean	Std. Dev.	t	P	Mann-Whitney P
Log of Total Assets	Respondent	281	18.01	2.68	3.52	0.01	0.01
	Non-respondent	961	17.45	2.21			
Log of Operating Revenue	Respondent	281	16.10	3.95	1.88	0.06	0.09
	Non-respondent	961	15.61	3.31			
Number of employees	Respondent	281	1801	6416	1.73	0.08	0.39
	Non-respondent	645	1011	3582			
Number of years operating	Respondent	281	32.50	40	2.17	0.03	0.03
	Non-respondent	505	25.37	35			

Results suggest no significant differences at the $p > 0.05$ between respondents and non respondents measured by mean natural logarithm of operating revenues and mean number of employees (mean = 16.10, standard deviation = 3.95 versus mean = 15.61, standard deviation = 3.31, $t = 1.88$, $p = 0.06$ and mean = 1801, standard deviation = 6416 versus 1011, standard deviation = 3582, $t = 1.73$, $p = 0.08$). However, results for the size variable, natural logarithm of total assets indicate respondent companies are significantly larger than non respondents (mean = 18.01, standard deviation = 2.68 versus mean = 17.45, standard deviation = 2.21, $t = 3.52$, $p = 0.01$) and have been listed on the ASX for a longer period of time (mean = 32.50, standard deviation = 40 versus mean = 25.37, standard deviation = 35, $t = 2.17$, $p = 0.03$). Hence, results may not be generalisable to the entire population of ASX listed companies.

In their study examining sourcing the internal audit function from a TCE perspective Widener and Selto (1999) report the same bias and maintain the difference does not provide sufficient evidence to adversely affect the study. They argue larger companies are prepared to devote the resources to responding to a survey. More decision making about governance choice is made by larger companies because they are bigger consumers of the service, that is internal audit or risk management, and therefore the survey is of greater interest to respondents. It is proposed the same argument applies for companies with longer operating histories who are likely to have more established risk management functions and therefore systems in place to grant more convenient access to data for response purposes.

5.6.2 Early versus late respondent bias

Testing for response bias based on the time taken to return the survey questionnaire is conducted at two levels. First, the sample is divided into the two categories of early respondents categorised as median days or less to reply and late respondents as replying in greater than the median number of response days. Second the sample is divided into three categories, early (19 days and less) versus middle (20 to 42 days) versus late (43 to 111 days) respondents on the basis of the length of the survey administration period being 111 days (Speklé et al., 2007; Widener and Selto, 1999). Results are reported in tables 5.15 and 5.16 below.

Table 5.15 - Results of statistical tests for early versus late respondent bias

Variable	Category	N	Mean	Std Dev	t	P	Mann-Whitney P
Log of Total Assets	Early Respondent	151	18.34	2.47	1.94	0.73	0.02
	Late respondent	130	17.77	2.41			
Log of Operating Revenue	Early Respondent	151	16.64	3.94	2.48	0.90	0.01
	Late respondent	130	15.48	3.89			
Number of employees	Early Respondent	151	2023	5496	0.59	0.50	0.93
	Late respondent	130	1506	7488			
Number of years operating	Early Respondent	151	11.38	12.50	0.88	0.08	0.16
	Late respondent	130	10.20	9.20			

Table 5.16 - Results of statistical tests for early versus middle versus late respondent bias

Variable	Category	N	Mean	Std Dev	Levene Stat.	Mann-Whitney P
Log of Total Assets	Early Respondent	100	18.45	2.33	0.53	0.59
	Middle Respondent	92	17.82	2.61		
	Late respondent	89	17.92	2.41		
Log of Operating Revenue	Early Respondent	100	17.01	3.39	2.83	0.06
	Middle Respondent	92	15.68	4.33		
	Late respondent	89	15.51	4.00		
Number of employees	Early Respondent	100	1837	5102	0.24	0.79
	Middle Respondent	92	1635	4953		
	Late respondent	89	1928	8893		
Number of years operating	Early Respondent	100	12.00	13.85	3.67	0.03
	Middle Respondent	92	9.87	9.18		
	Late respondent	89	10.51	9.32		

Results indicate no significant differences at the $p > 0.05$ level between the two groups of early and late survey respondents using independent samples t test and the non parametric Mann Whitney U Test on the basis of size measured by employees ($p = 0.50$ and 0.93) and number of years operating ($p = 0.08$ and 0.16). Results for the independent t tests indicate no significant differences on the basis of size measured by natural logarithm of total assets ($p = 0.73$) and by natural logarithm of operating revenues ($p = 0.90$). However, results from the non parametric Mann Whitney U Test for these two comparison variables indicate a significant difference on the basis of size measured by these two variables (natural logarithm of total assets, $p = 0.02$ and natural logarithm of operating revenues $p= 0.01$).

One way between groups ANOVA is used to test for differences in the sample divided into the three groups representing early, middle and late respondents. Results indicate no significant differences between the groups for any of the size variables (natural logarithm of total assets: Levene = 0.53, $p = 0.59$; natural logarithm of total operating revenues: Levene = 2.83, $p = 0.06$; number of employees: Levene = 0.24, $p = 0.79$). However a significant difference is reported between groups in the number of years they have been operating in results from the non parametric Mann Whitney U Test ($p = 0.03$). On balance it is suggested there is limited difference between respondents on the basis of time of response.

5.6.3 Mail versus email respondent bias test

The results reported in table 5.17 suggest no significant difference at the $p > 0.05$ level between mail and email respondents on the basis of company size and age. The significance reported in the number of employees in the t test is not supported in the results for non parametric Mann Whitney U Test.

Table 5.17 - Results of statistical tests for mail versus email respondent bias

Variable	Category	N	Mean	Std Dev	t	P	Mann-Whitney P
Log of Total Assets	Mail	238	18.12	2.52	0.66	0.08	0.66
	Email	43	17.85	2.07			
Log of Operating Revenue	Mail	238	16.27	4.00	1.69	0.74	0.06
	Email	43	15.16	3.57			
Number of employees	Mail	238	2018	6870	1.26	0.03	0.20
	Email	43	433	1110			
Number of years operating	Mail	238	10.81	11.40	-0.11	0.36	0.42
	Email	43	11.01	9.51			

In summary, there are some significant differences in terms of size and the number of years of operations between respondents which is acknowledged as a limitation of this study. However, it is suggested there is minimal evidence that response bias has adversely affected the research project.

5.7 INTERACTIONS

Williamson (1979) maintains asset specificity, uncertainty and frequency should not be examined in isolation but as interactions between the dimensions. Williamson (1985, p. 74 & 79) justifies this by proposing that for transactions characterised by low asset specificity, uncertainty and frequency are of little consequence because new trading relations can be easily arranged and continuity has little value. Therefore, outsourcing is favoured. In contrast increasing uncertainty creates the imperative to devise mechanisms to deal with the gaps and contractual adaptations that inevitably arise for transactions characterised by high asset specificity. Under these circumstances TCE predicts internal production is demanded as repeated renegotiation of contracts is achieved more efficiently in house as opposed to more formal agreements with external parties (Williamson, 1985, p. 56).

Although the majority of empirical research studies have operationalised the three TCE dimensions individually to explain the governance structure (Widener and Selto, 1999), many studies have employed interactions between asset specificity as the key driver and the other dimensions (Anderson, 1985; Anderson and Schmittlein, 1984; Murray and Kotabe, 1999; Nicholson et al., 2006; Speklé et al., 2007; Widener and

Selto, 1999). However despite Williamson's assertion, there is mixed and conflicting evidence for the interaction terms as significant predictors of governance choice.

Anderson and Schmittlein (1984) find no significant relation between the interaction terms asset specificity and behavioural and environmental uncertainty and the use of an integrated versus non integrated sales force. However Anderson (1985) reports a positive relation between the interaction term asset specificity and environmental uncertainty and the decision to outsource the sales function, which is the opposite direction predicted by the theory. Results from Wang (2002) support the proposition that asset specificity alone is not a decisive factor and only influences the choice to internalise software development activities when combined with behavioural uncertainty. Widener and Selto (1999) and Speklé et al., (2007) find no significant support for interactions between asset specificity and behavioural and environmental uncertainty and the sourcing decision for internal audit services. Although a significant relation between the interaction of asset specificity and frequency and outsourcing is found, it is in the opposite direction predicted by the theory. Widener and Selto (1999) attribute this to possible outliers in the sample and Speklé et al., (2007) to the high proportion of companies that do not outsource any internal audit activities.

This study extends the restricted linear and logistic regression models to include multiplicative interaction terms using a dummy variable for asset specificity interacting with the uncertainty and frequency variables. Asset specificity is operationalised as a dichotomous binary variable measured as high versus low asset specificity based on the level of expenditure on research and development[53]. Results suggest none of the interactive terms are significant predictors of governance choice. An F test of the sum of squared residuals is conducted to compare the expanded model (including the interaction variables) with model three (the restricted model). Results ($F(9,246) = 0.36$, $p = 0.95$) indicate that there is no significant difference. The model specifications and results are reported in Appendix E-1.

[53] High is given a value of 1 = greater than the mean scaled expenditure on research and development, otherwise low = 0. For robustness purposes an alternative measure of asset specificity was also tested in the interactive model, the standardised summary scores of the survey items for the four dimensions, company skills and training, contractual characteristics and staff turnover and the archival variable expenditure on research and development. Results indicated the model is not significant at the $p<0.05$ level.

5.8 CONCLUSION

This study uses transaction cost economics (TCE) to identify factors influencing Australian Securities Exchange (ASX) companies' decision to internally generate or outsource activities required to manage risk. A unique data set obtained from a survey sample of 271 listed ASX companies in 2009 is combined with archival data and hypotheses is operationalised and analysed using linear and logistic regression. This chapter presented the findings.

Broadly in line with the TCE propositions expenditure on research and development, staff turnover in risk management relative to other service functions and environmental uncertainty measured in terms of technological change and transaction frequency is associated with less outsourcing of risk management activities. Uncertainty due to environmental diversity measured by the number of subsidiaries and recent restructures, acquisitions or mergers is associated with more outsourcing of risk management activities. Behavioural uncertainty related to new staff is also associated with more outsourcing.

Contrary to the theoretical predictions of TCE, volatile sales are associated with more outsourcing and competition and overseas sales are associated with less outsourcing of risk management activities. Training and contract duration, hypothesised as indicators of asset specificity are associated with more outsourcing.

Big4 suppliers are associated with more outsourcing of risk management activities and leverage is associated with less outsourcing of risk management activities. Financial distress is associated with the decision not to outsource in the whole sample of companies and associated with more outsourcing for the subsample of companies that do outsource risk management activities. Capital intensity is associated with more outsourcing in the whole sample of companies and there is a marginal association with less outsourcing for the subsample of companies that do outsource risk management activities.

CHAPTER 6
DISCUSSION AND CONCLUSION

6.1 INTRODUCTION

This chapter presents a summary of the thesis, acknowledges the limitations of the study, and discusses the implications of the research in the following sections. Section 6.2 summarises the motivation, research question and contribution. Section 6.3 summarises the results of the hypotheses testing and section 6.4 discusses the study's limitations and implications for the theory of the research findings. Section 6.5 suggests opportunities for future research and section 6.6 concludes the chapter.

6.2 SUMMARY OF RESEARCH MOTIVATION, RESEARCH QUESTION AND CONTRIBUTION

Risk management is a recognised business discipline with a broad supporting infrastructure in academe and professional practice. Development of a sound framework of risk oversight, risk management and internal control is fundamental to good corporate governance (ASX Corporate Governance Council, 2008; ASX Markets Supervision, 2009). Management are responsible for development of a system (structures, policies, and procedures and culture) to identify, assess, treat and monitor risk to support achievement of the organisation's objectives. The services required to support a company's risk management activities can be conducted in house by employees of the company, outsourced to professionals such as accounting practices or other professional consultants or by a combination of internal and external sources. Using the theoretical framework of TCE, this study examines what internal and external factors influence this decision. The research question is 'what are the internal and external factors influencing the decision to internalise or outsource risk management activities?'

The ASX listing rules impose disclosure and certification requirements for risk management through the Corporate Governance Principles (ASX Corporate Governance Council, 2003, 2007a). The legal authority for these principles is sections 793C and 1101BN of the Corporations Act (Commonwealth of Australia, 2002). The ASX

Corporate Governance Council released the first edition, Principles of Good Corporate Governance and Best Practice Recommendations, in March 2003. The 2003 version of the Principles was updated in 2007. The revised version, Corporate Governance Principles and Recommendations (2007), more clearly defines the board and management's responsibilities for risk oversight, management and disclosure. A key change is the expansion of the scope of Principle 7: Recognise and Manage Risk to reflect the heightened concern and increasing expectations of stakeholders for risk management (ASX Corporate Governance Council, 2008). Whereas previously the focus was on the risks surrounding financial reporting, the changes place greater emphasis on reporting and disclosing the effectiveness of risk management across a broader range of risks (KPMG, 2007). The scope of risks has been broadened by adopting the concept material business risks which the ASX Corporate Governance Council (2008, p. 2) defines as "the most significant areas of uncertainty or exposure, at a whole-of-company level, that could have an adverse impact on the achievement of company objectives".

This study is motivated by a number of factors. First, limited research exists on the characteristics of companies' risk management systems in individual organisational settings (Bhimani, 2009). Prior research, overseas and in Australia, has tended to focus on specific functional areas of risk management such as internal audit (Carey et al., 2006; Goodwin-Stewart and Kent, 2006; Speklé et al., 2007; Widener and Selto, 1999). Second, from a theoretical perspective, there is an extensive growing body of empirical TCE research across business disciplines. However, its application in accounting is relatively scarce (Macher and Richman, 2008) and mainly confined to management accounting, for example, Carey et al., (2006), Speklé et al., (2007) and Widener and Selto (1999). Bhimani (2009) proposes the relationships between management accounting, corporate governance and risk management have been addressed only to a minimal extent in the academic literature but they are increasingly intertwined and inextricably interdependent. Applying the TCE framework in the context of risk management extends the application of the theory.

This study contributes to the existing literature in a number of ways. First, few studies explore how risk management works in practice and how it is organised using

internal employees and external consultants (Arena et al., 2010; Power, 2009). Previous studies have applied TCE to explain the sourcing decision for internal audit activities (Speklé et al., 2007; Widener and Selto, 1999) and managerial advisory services (Kent, 2011) but have not applied it to the risk management function.

Second, this research is timely because of the increased regulatory focus on risk management activities given the recent global financial crisis and the additional compliance burden placed on listed entities by the revised Corporate Governance Principles in Australia. Hence, this study is undertaken in an important period because data has been collected from companies for 2009 which is the first full reporting year following the implementation of the revised Principle 7: Recognise and Manage Risk. Third, this data obtained from a survey sample of 271 companies listed on the ASX in 2009, combined with archival data from the company's annual reports is unique.

This research has implications for companies when making decisions about governance choice for risk management activities. Results suggest the factors management should consider are those associated with the internal and external environment. It is suggested management make decisions on governance choice based on production and transaction costs of each alternative. Transaction costs by their very nature are the least transparent. This study undertakes to investigate directly the factors influencing the risk management sourcing decision. This knowledge, by increasing and promoting understanding of the issues, can be used by managers and professional bodies to enhance their decision making on the choice of governance for risk management.

6.3 SUMMARY OF RESULTS

TCE views the company as a governance structure based on a series of contractual agreements (Alchian and Woodward, 1988). Transaction costs are those associated with contracting for the procurement of goods and/or services. Whether transactions are organised within the company or between companies across a market is a decision which depends on the transaction costs for each alternative. The more complex the transaction between two different parties in the market, the more costly it is to negotiate, write and enforce a contract and this creates transaction costs. Companies

and markets are alternative governance structures differing in their transaction costs (Coase, 1937). Therefore, assuming cost minimisation is the goal, there is a need to align governance structures with the drivers of transaction costs in order to reduce costs (Widener, 2004; Williamson, 1991b). Economising on transaction costs is realised by assigning a transaction to a governance structure according to its attributes, which can be characterised by the three broad principal dimensions of asset specificity, uncertainty and frequency that have identifiable relative qualitative and measurable quantitative characteristics (Williamson, 1973, 1979, 1981a, 1981b, 1983a, 1983b, 1985, 1988a, 1988b, 1989, 1991a, 1991b, 1993, 1998, 2002, 2005; Williamson et al., 1975). Four principle hypotheses are developed from the theoretical framework provided by TCE predicting the governance choice for a company's risk management activities. Data from the 271 survey questionnaire respondents combined with archival data from their companies' annual reports is used to test the hypotheses developed in chapter 2.

Linear and logistic multivariate regression is used to analyse the data on two levels. First for the sample of 271 companies that responded to a survey questionnaire, and second for a sub sample of 125 companies reporting outsourcing risk management activities. Models three (271 companies) and seven (125 companies) apply linear regression with the dependent variable as the proportion of risk management outsourced. Models four and eight apply logistic regression examining the sourcing decision as discrete alternatives for the whole sample. Model four examines sourcing decision for risk management activities as the discrete alternative of yes or no. Model eight includes only outsourcing companies and the dependent variable is measured as a high and low dichotomous variable.

Support is found for hypothesis 1 in that the transaction specificity of the human assets involved in the provision of risk management activities is negatively related to the proportion outsourced. Results confirm that as expenditure on research development rises companies outsource less risk management activities. Further support is found with expenditure on research and development associated with the decision not to outsource risk management activities. Lower staff turnover in risk management relative to other service functions is associated with low outsourcing of risk management activities in companies that outsource some. Contrary to theoretical propositions

evidence exists that training and contract duration for external suppliers of risk management activities are associated with increased outsourcing.

Support is found for hypothesis 2a that environmental uncertainty due to technological change is associated with less outsourcing of risk management activities. No support is found for hypothesis 2a that environmental uncertainty due to volume/demand is negatively related to the proportion or decision to outsource. Results from all four models (three, four, seven and eight) indicate companies with more variable sales outsource more risk management activities.

Support is found for hypothesis 2b that environmental uncertainty due to diversity is associated with more outsourcing of risk management activities. Results from all four models (three, four, seven and eight) indicate the proportion outsourced and the decision to outsource is positively related to the number of subsidiaries. Evidence is provided that companies that have had a restructure, acquisition or merger in the past three years outsource proportionally more risk management activities. Contrary to the theoretical expectations of hypothesis 2b, as the level of competition within the industry and overseas revenue as a proportion of total revenues rises companies outsource less risk management activities.

No support exists for hypothesis 3a that behavioural uncertainty associated with external suppliers of risk management activities leads to less outsourcing. Support is found for hypothesis 3b that companies with newer management outsource more risk management activities because of the behavioural uncertainty associated with existing staff for the proportion outsourced and for the decision to outsource.

Support is found for hypothesis 4 that higher frequency of risk management transactions is associated with less outsourcing from all four models (three, four, seven and eight).

Companies using a Big4 accounting company and capital intensive companies are associated with the decision to outsource risk management activities. Financial distress is associated with the decision not to outsource in the whole sample of 271 respondent companies. This is in contrast to results from the analysis of the subsample

of 125 companies that do outsource risk management activities where financial distress is an indicator of more outsourcing. Higher leverage is associated with less outsourcing and the decision not to outsource. There is no evidence that companies with higher industry knowledge transfer costs outsource more risk management activities. A tabulated summary of these results is presented in Appendices F-1 to F-3.

6.4 RESEARCH LIMITATIONS AND IMPLICATIONS FOR THEORY

There are a number of limitations to this study. The following is a discussion of the limitations imposed by the threat of measurement error and those associated with the theoretical framework along with implications for theory.

The results for the multiple predictor variables from the survey questionnaire operationalised in the regression are subject to the general limitations of survey data. Values are based on respondents evaluations and measurement error occurs when an observed value differs from the actual value (Hair Jnr., Black, Babin, and Anderson, 2010; OECD). This can result in two types of error. Type one errors are rejection of the null hypothesis when it is actually true. Generally referred to as a false positive, it is stating there is a correlation between variables when in fact none exists. Type two errors, the opposite of type one errors, are the threat of failing to reject the null hypothesis which is not finding a correlation when it does exist. Type one errors are considered more serious as they are inferring a relation exists when in fact it does not. However given results for many of the survey variables are not significant both type one and type two should be considered.

The use of multiple variables and reliance on their combination focuses attention on the issue of measurement error (Hair Jnr. et al., 2010). Hence intercompany and inter industry comparisons must be made with caution (Macher and Richman, 2008). All variables used in multivariate regression have some degree of measurement error (Hair Jnr. et al., 2010). Reliability and validity of the measures have to be considered in assessing the research (Flynn et al., 1990). Validity refers to the extent to which the empirical measure adequately reflects the construct it has been developed to represent. (Hair Jnr. et al., 2010; Sekaran, 2003). Reliability relates to the precision and consistency of the instrument to measure its intended construct (DeCoster, 2005;

Sekaran, 2003). The following presents a discussion of the processes undertaken to minimise threats to validity and reliability of the measurements used in this research study.

Construct validity testifies to the extent the instrument measuring the construct fits with the theory (Sekaran, 2003) and is the ultimate objective of scale development (Sekaran 2003). A construct is a representation of something that does not exist as an observable dimension and the more abstract, the harder to measure (Nunnally 1978). To strive for construct validity the items and scales used in this study to measure the TCE dimensions in the context of risk management activities rely heavily on adapting measures from existing cross-disciplinary studies as discussed in chapter 3. Given the research context and Australian setting, the measures used for risk management are subject to compounding measurement error and this is a limitation of the study.

Face validity is the degree to which items appear to reflect the intended construct they have been designed to measure (Sekaran, 2003). Content validity ensures there is adequate capture of the domain of interest with sufficient items and without extraneous content (Hinkin, 1995, 1998). To minimise threats to content and face validity a panel of academic experts consisting of six professors from accounting, management, economics and marketing provided guidance advice throughout the survey questionnaire development process (Aubert et al., 1996a, 2003; Klein, 1989; Klein et al., 1990; Nam et al., 1996; Widener and Selto, 1999). Pretesting content and face validity ensures conceptually inconsistent items can be dropped and the questions in the survey in appearance and measurement adequately assess domains of interest (Sekaran, 2003).

This study relies on a number of individual questionnaire items combined in a summary measure to operationalise the TCE construct asset specificity. The reliability of this measure is tested using Cronbach's alpha coefficient which indicates how well the items measuring the construct are positively correlated to one another; the closer to one, the higher the internal consistency and reliability (Sekaran, 2003). Cronbach's alpha is frequently used in academic studies of governance employing survey methodology, for example (Ang and Cummings, 1997; Artz and Brush, 2000; Aubert et al., 1996b, 2003; Carey et al., 2006; De Vita et al., 2009; Gilley and Rasheed, 2000b;

Nam et al., 1996; Speklé et al., 2007; Wang, 2002; Widener, 2004; Widener and Selto, 1999; Zaheer and Venkatraman, 1995).

Conclusions have been drawn from a sample size of 271 which represents 16.82 per cent of the surveyed population. The small sample size, although comparable with prior studies as discussed in chapter 5, is a limiting factor and although there is limited evidence of sampling bias results may not be generalisable to the population of Australian listed companies or their international counterparts. In addition Australia is a unique setting, in contrast to the U.S and other regimes, because compliance with corporate governance regulations is quasi-voluntary reducing comparability of results outside Australia.

This study primarily emphasises TCE to explain the decision to internalise or outsource risk management activities and this is a potential limiting factor. The literature emphasises that companies may have numerous non TCE related motives for selecting a governance choice in addition to reducing transaction costs (Erramilli and Rao, 1993). Other theoretical frameworks predict the boundaries of the company and agency theory and resource based approaches are complementary theories.

Significant results are found to support the theoretical predictions of TCE for the archival proxy, investment in research and development. Widener and Selto (1999) in examining the sourcing decision for internal audit services draw on resource based theory. They propose firms respond to competitive pressures by focusing scarce resources on competitive advantage and internalising internal audit if the function is intended to reinforce the firm's strategy. Acknowledging resource based theories, it is proposed that research and development is another a strategic imperative viewed as a source of sustainable competitive advantage (Barney, 1991). There is evidence to support this proposition from the current study with 70.48 per cent of companies identifying risks associated with strategy as covered under their risk management system and 54.80 per cent of respondents noting strategic importance as a reason to internalise risk management activities. Beaumont and Sohal (2004) find evidence companies maintain activities in house rather than outsource if they are strategic in nature through fear of dependence and loss of flexibility regardless of the degree of specificity of the asset involved.

Results from this study provide strong support for uncertainty as a factor influencing governance choice for risk management activities. This study decomposes the TCE dimension uncertainty into four broad dimensions of volume/demand, technological, diversity and behavioural uncertainty. Significant results for a number of constructs operationalised individually provide support for the underlying TCE propositions. Environmental uncertainty due to technological change, diversity measured by the number of subsidiaries, and recent structural and managerial change are associated with outsourcing proposed by TCE. However, results for environmental uncertainty associated with demand/volume, industry competition and proportion of overseas revenues are in contradiction to the theoretical predictions of TCE and a number of prior studies. It is proposed this study provides evidence to support the proposition environmental uncertainty is a multi-faceted construct requiring examination of the dimensions individually. Recall that many prior studies examine environmental uncertainty as a single dimension reporting mixed and conflicting results and therefore providing limited support for the theoretical predictions of TCE. It is suggested this is due to measurement issues associated with composite measures consisting of a broad range of constructs, predicting conflicting governance modes. David and Han (2004) propose the TCE construct uncertainty has been loosely interpreted with a considerable assortment of measurements and conclude future research should be firmly grounded on core TCE propositions.

In support of TCE theoretical predictions, results provide evidence transaction frequency is associated with less outsourcing of risk management activities. Recall that researchers in TCE observe frequency has not received the academic scrutiny that asset specificity and uncertainty have and results are conflicting (David and Han, 2004; Geyskens et al., 2006; Macher and Richman, 2008; Rindfleisch and Heide, 1997). Macher and Richman (2008, p. 7) propose that given TCE researchers have been largely unable to confirm the effects of transactional frequency on governance modes and greater theoretical and empirical treatment of frequency is required. Check this This study uses a composite proxy variable for company size to measure frequency as data from questionnaire items intended to measure frequency of transactions (the number of individual projects and total expenditure on risk management activities) was reported as unavailable by a large number of survey respondents and this is acknowledged as a

limitation. Researchers acknowledge the limitations of proxy measures, arguing the measure is likely capturing the effects of economies of scale and greater theoretical and empirical treatment of frequency is required (Macher and Richman, 2008; Widener and Selto, 1999).

This study has explored the decision to internally generate or outsource risk management activities as a discrete choice between two alternatives, outsource or not, with only the magnitude of activities outsourced considered. However Williamson (1985, 1991a) discusses a third form of governance contract, an intermediate hybrid option such as a joint venture or strategic alliance. Frequently referred to as relational governance, hybrids are considered a viable alternative to internal production when the market fails (Geyskens et al., 2006). Incorporating a large informal component, relational governance lacks transparency and is therefore not easily measured or legally enforceable. Sociologists argue they operate their own safeguard mechanisms to guard the future value of the relationship (Geyskens et al., 2006). Relational governance as an option for risk management activities is not considered in this study and this is acknowledged as a limitation common to many similar studies. In a study of 133 journal articles from 35 journals from 1971 to 1992 Lohtia, Brooks, and Krapfel (1994) note concentration on the two alternatives, outsourcing in the market or internal production is key limitation in the TCE literature.

6.5 SUGGESTIONS FOR FUTURE RESEARCH

This research has examined a key aspect of corporate governance, risk management, through the lens of TCE. Mixed and conflicting results provide many opportunities for further research in this field. In addition further evidence is provided for future research to integrate TCE with other theoretical frameworks such as agency theory and resource based theories as suggested by a number of researchers (Arnold, 2000; David and Han, 2004; Jin and Doloi, 2008; Leiblein, 2003; Macher and Richman, 2008).

Corporate governance is intrinsically linked to risk management and the quality of a company's governance impacts this decision. Future research opportunities lie in examining the governance characteristics of the respondent companies as potential

drivers of risk management implementation. Beasley et al., (2005) examine a number of governance characteristics as potential drivers of enterprise risk management implementation. Pagach and Warr (2010) examine drivers of enterprise risk management implementation and find that company size, leverage, volatility of operating cash flows and level of institutional ownership are factors that are positively associated with the likelihood of initiating an enterprise risk management program. Abbott et al., (2007) in their examination of the monitoring and oversight role that the audit committee plays in the financial reporting process control for quality of corporate governance via a governance rank variable which includes board independence, board size, CEO duality, proportion of inside ownership and blockholder ownership as governance characteristics.

The theoretical framework of TCE relies on a number of underlying contextual behavioural assumptions in which company specific variables prevail. Opportunities exist for future research to explore measurement and operationalisation of opportunism and risk preference. Recall, Williamson (1985) states that absent opportunism there is no reason to supplant the market with a hierarchy. Macher and Richman (2008) suggest future research should explore and seek to measure and operationalise opportunism as a construct. Given risk management activities are predominantly performed by professional knowledge workers (as evidenced by 92 per cent with a university degree or equivalent in this study) there is more difficulty associated with monitoring and measuring outputs compared with workers involved in the production of a good. Opportunism is therefore a major consideration for operationalising more effectively in future TCE research associated with professional knowledge workers.

Risk preference refers to the propensity for humans to exhibit variable risk preference behaviours when making decisions (Williamson, 1985). Williamson proposes risk preference affects the choice of governance structure and risk averse decision makers are likely to choose internal organisation whereas risk seeking decision makers prefer a market exchange. Although Williamson (1985) adopts an assumption of risk neutrality in TCE on the basis the focus should be on the transaction's attributes rather than the risk attitude of the transactors he acknowledges the importance of risk preferences for decision makers. Chiles and McMackin (1996) seeking to build on

Williamson's approach propose that risk preference manifests itself at a company level in a number of ways, one of which is the choice to be highly leveraged for risk seeking decision makers. There is the opportunity for future research to examine the relation between a company's financial structure as a measure of company level risk preference and their risk management characteristics.

6.6 CONCLUSION

This chapter presented a summary and of the thesis, and discussed the results and their theoretical implications. The limitations of the research are identified along with implications for the theory. A number of suggestions for future research are presented. This chapter concludes the thesis.

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Appendix A-1 Survey Questionnaire (Front Page)

1. ***Please tick all the categories of risks covered under your company's risk management system for the 2009 financial year, and indicate for those ticked if they are outsourced to external consultants yes or no (circle Y/N). Finally, could you please indicate with another tick, which of those categories were your top three priorites in 2009.***

	✓	Outsource Y/N	Top 3		✓	Outsource Y/N	Top 3		✓	Outsource Y/N	Top 3
Climate Change	☐	Y / N	☐	Human Capital/People	☐	Y / N	☐	Safety	☐	Y / N	☐
Compliance	☐	Y / N	☐	Market Related	☐	Y / N	☐	Strategic	☐	Y / N	☐
Environmental	☐	Y / N	☐	Operational	☐	Y / N	☐	Sustainability	☐	Y / N	☐
Ethical Conduct	☐	Y / N	☐	Product/Service Quality	☐	Y / N	☐	Technological	☐	Y / N	☐
Financial Reporting	☐	Y / N	☐	Reputation/Brand	☐	Y / N	☐	Other *(please specifiy):*	☐	Y / N	☐

2. ***For the 2009 financial year, which best describes how your company sourced it's risk management activities?***

A. All done internally by company's employees ☐ *If ticked this box then go to* ***Question 7:***

B. All purchased from external consultants ☐ *If ticked this box then go to* ***Question 4:***

C. Both done internally & outsourced to external consultants ☐ *If ticked this box then go to* ***Question 3:***

3. ***Estimated % outsourced :*** **0-10%** ☐ **11-25%** ☐ **26-49%** ☐ **50-74%** ☐ **75-90%** ☐ **91-100%** ☐

4. ***To whom?*** **External Auditor** ☐ **Big 4 Accountant** ☐ **Non-Big 4 firm** ☐ **Other Professional Services** ☐
(please tick all that apply)

5. What is the average length of a contract with an external consultant for risk management services? **Less than 1 yr** ☐ **1-3 yrs** ☐ **More than 3 yrs** ☐

6. Does your company provide training to your external consultants to enable them to provide you with risk management services? **Yes** ☐ **No** ☐

Please circle the number below that best describes your opinion of each statement with respect to your company:

	Strongly disagree	*Disagree*	*Tend to disagree*	*Tend to agree*	*Agree*	*Strongly agree*
7. Staff working in a risk management capacity acquire specialised knowledge, skills & abilities that would not be transferable to another company (i.e. *'company specific'* skills).	1	2	3	4	5	6
8. It would be hard for an industry experienced and suitably qualified outsider to work in risk management in our company without additional *'company specific'* training.	1	2	3	4	5	6
9. Training in *'company specific'* skills for new risk management staff represents a significant investment for our company.	1	2	3	4	5	6
10. It is or would be difficult to include all aspects of performance (e.g. quantity, quality & timeliness) in contractual arrangements with any external consultants we engage for risk management activities.	1	2	3	4	5	6
11. A high degree of 'company-specific' skills are required to effectively carry out risk management in our organisation.	1	2	3	4	5	6
12. Employment contracts with staff working in our company's risk management function include performance incentives designed for retention purposes (e.g. promotion opportunities).	1	2	3	4	5	6

13. Could you estimate on average how many hours per year each employee who works in risk management undertakes *'company specific'* training?	hrs
14. Could you estimate the annual rate of staff turnover in your company?	%

Please turn over page.

Appendix A-2 Survey Questionnaire (Back Page)

Please circle the number below that best describes your opinion of each statement/question with respect to your company:

	Much lower	*Lower*	*About the same*	*Higher*	*Much higher*
15. The turnover of staff working in risk management activities compared to staff turnover in other service functions is:	1	2	3	4	5
	Very difficult	*Difficult*	*Moderate*	*Easy*	*Very easy*
16. How easy it is to evaluate the quality of outsourced risk management activities in your company?	1	2	3	4	5
	No modification	*Slightly modified*	*Mixed*	*Mostly modified*	*Completely modified*
17. To what extent do risk management processes have to be adapted or modified to suit different divisions/departments requirements?	1	2	3	4	5
	Changing very slowly	*Changing slowly*	*Changing moderately*	*Changing rapidly*	*Changing very rapidly*
18. How stable/dynamic would you rate the external economic environment facing your company?	1	2	3	4	5
19. What is your assessment of the rate of technological change in your industry?	1	2	3	4	5

	0%	*Less than 50%*	*More than 50%*	*Uncertain*
20. Approximately how much time did your staff and/or external consultants performing risk management activities spend working with *'commercial in confidence/proprietary'* information?	☐	☐	☐	☐

21. Could you estimate how many separately identifiable risk management projects and ongoing operational activities (including internal audit, special projects, fraud analysis) were performed in your company for the 2009 financial year? ☐

22. Could you estimate your company's total expenditure on risk management activities undertaken in the 2009 financial year? $ ☐ ,000

23. How many full time equivalent staff work in risk management? ☐ Could you estimate what proportion of them have professional qualifications such as a university degree or equivalent? ☐ %

24. ***If you <u>INTERNALISE</u> some or all risk management activities, which of the following reasons apply to your company's decision to do so? (please tick)***

Strategic importance	☐	Non-standard nature of tasks	☐
Difficulty of managing relationships with external	☐	Loss of flexibility	☐
To mitigate risk of sub-optimal service	☐	Economies of scale	☐

Other (*please specify*): _____

25. ***If you <u>OUTSOURCE</u> some or all risk management activities, which of the following reasons apply to your company's decision to do so? (please tick)***

Access to expertise	☐	Variable demand requirements	☐
To concentrate on core activities and competencies	☐	To achieve best practice	☐
Share risks	☐	Routine nature of activity	☐

Other (*please specify*): _____

Please tick this box if you wish to receive a summary of the results: ☐ **ASX Code:** ☐

<u>THANK YOU</u> so much for taking the time to support this research. If you have mislaid the reply paid envelope please forward to:

Reply Paid 67293, Jacqueline Christensen, Faculty of Business, Technology & Sustainable Development, Bond University, GOLD COAST, QLD 4229

Appendix A-3 Questionnaire Covering Letter

Date

«First_Name» «Second_Name»
«Job_Position»
«Company_Name»
«First_Line_of_Address»
«TOWN» «STATE» «Postcode»

Dear «First_Name»,

Sourcing Risk Management Services

We are conducting important university research that will identify the factors that determine an organisation's decision to use external consultants or internal employees when certifying the financial statements as per S295A of the Corporations Act and 'Recommendation 7 – Recognise and Manage Risk'. (*On the back of this page is a more comprehensive explanatory statement*). Our research is Australian based and involves all companies currently listed on the ASX.

We would greatly appreciate **about five minutes** of your time to complete the enclosed, ***2-page survey.*** No long answers or opinions are necessary and a **reply paid self-addressed return envelope** is enclosed. We have included your company's ASX code on the completed survey so that we can combine your response with publically available company information. In doing this we give you our **complete assurance** that your responses will be known only to the two researchers named below and will be considered highly confidential and secured accordingly. Only aggregate data will be used in the analysis and no individual company will be identified or identifiable in any report, article or paper that is written. This research project has gone through an ethical review process and been given approval by the Bond University Ethics Committee.

The survey is being sponsored by Bond University and the Accounting and Finance Association of Australia & New Zealand (AFAANZ). **Your contribution will assist in providing valuable insights into crucial aspects of the risk management activities of ASX listed companies** and the findings will provide useful guidance for public companies, regulators and professional bodies. It will be our pleasure to share our findings with you. Please indicate if you wish to receive a summary by ticking the box at the end of the survey.

If you are unable to answer any of the questions, please complete as much of the questionnaire as possible. All information is valuable and can be used to further this research.

Thank you so much for your assistance, your support is gratefully appreciated. If you have any queries please contact either of the following:

Kind Regards,

Professor Pamela Kent
Phone (07) 5595 2279
Email: pkent@bond.edu.au

Jacqueline Christensen
Phone (07) 5595 2294
Email: jchriste@bond.edu.au

Appendix A-4 Questionnaire Explanatory Statement

Factors influencing a company's decision to internally generate or outsource risk management activities.

Pamela Kent, Bond University and Jacqueline Christensen, Bond University[54]

The aim of this research is to identify factors that influence a listed company's decision to internally generate or outsource risk management. This study focuses on those activities required to support the certifications provided by the CEO and CFO (or persons acting in these roles) in accordance with S295A of the Corporations Act 2002 and the revised 2007 ASX Corporate Governance Principles and Recommendations as designated by ASX listing rule 4.10.3. The main context of this study is contained in 'Principle 7 – Recognise and Manage Risk' which was extended after a review of the original ASX Principles 2003. This recommendation states that companies should establish a sound system of risk oversight and management and internal control. Subsection 7.2 states:

"The board should require management to design and implement the risk management and internal control system to manage the company's material business risks and report to it on whether those risks are being managed effectively. The board should disclose that management has reported to it as to the effectiveness of the company's management of its material business risks".

This statement effectively broadens the scope of the risk oversight reporting role from primarily a focus on controls relating to the integrity of financial reporting to assurance against other material business risks.

The services and activities required for the development of a robust certification process can be handled in-house, outsourced to external consultants or a combination of both. This survey will capture firm specific data on the sourcing decision. When combined with archival data, the analysis will provide valuable insights into crucial aspects of the risk management activities of ASX listed companies and the findings will provide useful guidance for public companies, regulators and professional bodies. Organisations have much to learn about risk management and academic research in this domain will provide valuable insight and increase our understanding of the economic landscape.

Should you have any complaint concerning the manner in which this research is conducted, please do not hesitate to contact Bond University Ethics Committee quoting Project Number: RO-912 to:

The Complaints Officer
Bond University Human Research Ethics Committee
Bond University Research Institute
Level 2, Room 232, Conference Centre
Bond University, Gold Coast, QLD 4229
Telephone (07) 5595 4194; Fax (07) 5595 5009

«ASX Code»

[54] Jacqueline Christensen, PhD Candidate - is doing research towards a PhD under the supervision of Dr. Pamela Kent, a Professor in the Faculty of Business, Technology and Sustainable Development at Bond University.

Appendix A-5 Questionnaire First Follow-up Letter

Date

«First_Name» «Second_Name»
«Job_Position»
«Company_Name»
«First_Line_of_Address»
«TOWN» «STATE» «Postcode»

Dear «First_Name»,

Sourcing Risk Management Services

In the last three weeks we mailed you a survey seeking your assistance in our university research into risk management practices in ASX listed companies. If you have already completed the survey and returned it, please accept our sincere thanks. If not, we would greatly appreciate it if you could do so in the next few days. It is extremely important that data about your company is included in the study if the results are to accurately represent Australian companies.

In the event that by some chance you did not receive the survey or it has been misplaced, a replacement is enclosed. The survey is very brief, **only 2 pages** and should take **less than ten minutes** of your time to complete.

Your contribution to the success of this study will be greatly appreciated.

Kind Regards,

Professor Pamela Kent
Phone (07) 5595 2279
Email: pkent@bond.edu.au

Jacqueline Christensen
Phone (07) 5595 2294
Email: jchriste@bond.edu.au

Appendix A-6 Questionnaire Second Follow-up Letter

Date

«FIRST_NAME» «SECOND_NAME»
«POSITION»
«COMPANY_NAME»
«FIRST_LINE_OF_ADDRESS»
«TOWN» «STATE» «POSTCODE»

Dear «FIRST_NAME»,

Sourcing Risk Management Services

We recently wrote to you seeking your assistance in our university research into risk management practices in ASX listed companies and as of today we have not yet received your completed survey. We understand you will have many demands on your time but would ask you to take a few minutes of it to assist us in further understanding this crucial area of business. If you have already completed the survey and returned it, please accept our sincere thanks.

The survey is very brief, should take **about five minutes** to complete and a reply paid envelope is enclosed for your convenience. We give you our complete assurance that your responses will be known only to the two researchers named below and will be considered highly confidential and secured accordingly. Only aggregate data will be used in the analysis and **no individual company will be identified or identifiable in any report, article or paper that is written**.

Your contribution to the success of this study will be greatly appreciated. Thanking you in anticipation.

Kind Regards,

Professor Pamela Kent
Phone (07) 5595 2279
Email: pkent@bond.edu.au

Jacqueline Christensen
Phone (07) 5595 2294
Email: jchriste@bond.edu.au

Appendix A-7 Questionnaire Third Follow-up Email/Letter

Bond University Research Study – REMINDER

For the Urgent Attention of *First Name Last Name Position*

Sourcing Risk Management Services

We recently contacted you regarding a research study on risk management practices. If you have already completed the survey and returned it, please accept our sincere thanks.

To date the response rate has been encouraging and the data collected very useful, but we still need your. The electronic survey should only take **about five minutes** to complete. Here is a link to the survey (if you are unable to complete in one short session you can return via the link at anytime within the next two weeks).

Thank you.

Yours Faithfully,

Professor Pamela Kent, pkent@bond.edu.au
Jacqueline Christensen jchriste@bond.edu.au
Phone (07) 5595 2294

Appendix B-1 Industry Knowledge Transfer Costs Categorisation

Group	SIC Codes	Industry	Description	GIC Sectors	GICS Sub-Industry Code	GICS Sub-Industry	Knowledge Specialisation	KS Code	No. of Companies
1	(0100-0999)	Agriculture, Forestry and Fishing	This division includes establishments primarily engaged in agricultural production, forestry, commercial fishing, hunting and trapping, and related services.	Consumer Staples (30)	30202010	Agricultural Products	Specialized	1.0	1
2	(1000-1499)	Mining	This division includes all establishments primarily engaged in mining. The term mining is used in the broad sense to include the extraction of minerals occurring naturally: solids, such as coal and ores; liquids, such as crude petroleum; and gases such as natural gas. The term mining is also used in the broad sense to include quarrying, well operations, milling (e.g., crushing, screening, washing, flotation), and other preparation customarily done at the mine site, or as a part of mining activity.	Energy (10)	10102010	Integrated Oil and Gas	Specialized	1.0	1
				Energy (10)	10102020	Oil and Gas Exploration and Production	Specialized	1.0	17
				Energy (10)	10102050	Coal and Consumable Fuels	Specialized	1.0	12
				Materials (15)	15104010	Aluminium	Specialized	1.0	3
				Materials (15)	15104020	Diversified Metals and Mining	Specialized	1.0	35
				Materials (15)	15104030	Gold	Specialized	1.0	23
				Materials (15)	15104040	Precious Metals and Minerals	Specialized	1.0	8
3	(1500-1599)	Construction: General Building	This division includes establishments primarily engaged in construction. The term construction includes new work, additions, alterations, reconstruction, installations, and repairs.	UNUSED			Mixed	0.5	0
4	(1600-1699)	Construction: Heavy	This major group includes general contractors primarily engaged in heavy construction other than building, such as highways and streets, bridges, sewers, railroads, irrigation projects, flood control projects and marine construction, and special trade contractors primarily engaged in activities of a type that are clearly specialized to such heavy construction and are not normally performed on buildings or building-related projects.	Industrials (20)	20103010	Construction and Engineering	Specialized	1.0	12
5	(1700-1799)	Construction: Special Trade	This major group includes special trade contractors who undertake activities of a type that are specialized either to building construction, including work on mobile homes, or to both building and non-building projects.	UNUSED			Mixed	0.5	0

Appendix B-2 Industry Knowledge Transfer Costs Categorisation cont…

Group	SIC Codes	Industry	Description	GIC Sectors	GICS Sub-Industry Code	GICS Sub-Industry	Knowledge Specialisation	KS Code	No. of Companies
7	(2000-3999)	Manufacturing	The manufacturing division includes establishments engaged in the mechanical or chemical transformation of materials or substances into new products. These establishments are usually described as plants, factories, or mills and characteristically use power driven machines and materials handling equipment. Establishments engaged in assembling component parts of manufactured products are also considered manufacturing if the new product is neither a structure nor other fixed improvement. Also included is the blending of materials, such as lubricating oils, plastics resins, or liquors.	Energy (10)	10101020	Oil and Gas Equipment and Services	Specialized	1.0	3
				Materials (15)	15101010	Commodity Chemicals	Specialized	1.0	1
				Materials (15)	15101030	Fertilizers and Agricultural Chemicals	Specialized	1.0	2
				Materials (15)	15102010	Construction Materials	Specialized	1.0	2
				Materials (15)	15103020	Paper Packaging	Specialized	1.0	2
				Materials (15)	15104050	Steel	Specialized	1.0	9
				Materials (15)	15105010	Forest Products	Specialized	1.0	1
				Industrials (20)	20102010	Building Products	Specialized	1.0	3
				Industrials (20)	20104010	Electrical Components and Equipment	Specialized	1.0	1
				Industrials (20)	20104020	Heavy Electrical Equipment	Specialized	1.0	1
				Industrials (20)	20106010	Construction & Farm Machinery & Heavy Trucks	Specialized	1.0	1
				Industrials (20)	20106020	Industrial Machinery	Specialized	1.0	4
				Consumer Discretionary (25)	25101010	Auto Parts and Equipment	Specialized	1.0	2
				Consumer Discretionary (25)	25201050	Housewares and Specialties	Specialized	1.0	1
				Consumer Discretionary (25)	25203010	Apparel, Accessories and Luxury Goods	Specialized	1.0	2
				Consumer Discretionary (25)	25203030	Textiles	Specialized	1.0	1
				Consumer Staples (30)	30201030	Soft Drinks	Specialized	1.0	1
				Consumer Staples (30)	30202030	Packaged Foods and Meats	Specialized	1.0	2
				Health Care (35)	35101010	Healthcare Equipment	Specialized	1.0	5
				Health Care (35)	35101020	Healthcare Supplies	Specialized	1.0	2
				Health Care (35)	35201010	Biotechnology	Specialized	1.0	8
				Health Care (35)	35202010	Pharmaceuticals	Specialized	1.0	4
				Information Technology(45)	45201020	Communications Equipment	Specialized	1.0	1
				Information Technology(45)	45203010	Electronic Equipment and Instruments	Specialized	1.0	1

Appendix B-3 Industry Knowledge Transfer Costs Categorisation cont….

Group	SIC Codes	Industry	Description	GIC Sectors	GICS Sub-Industry Code	GICS Sub-Industry	Knowledge Specialisation	KS Code	No. of Companies
8	(4000-4999)	Transportation & Public Utilities	This division includes establishments providing, to the general public or to other business enterprises, passenger and freight transportation, communications services, or electricity, gas, steam, water or sanitary services, and all establishments of the United States Postal Service.	Energy (10)	10102040	Oil and Gas Storage and Transportation	Nonspecialised	0.0	1
				Industrials (20)	20304010	Railroads	Nonspecialised	0.0	1
				Industrials (20)	20305010	Airport Services	Nonspecialised	0.0	1
				Industrials (20)	20305020	Highways and Railtracks	Nonspecialised	0.0	3
				Industrials (20)	20305030	Marine Ports and Services	Nonspecialised	0.0	1
				Utilities (55)	55102010	Gas Utilities	Nonspecialised	0.0	1
				Utilities (55)	55103010	Multi-Utilities	Nonspecialised	0.0	1
9	(5000-5199)	Wholesale Trade	This division includes establishments or places of business primarily engaged in selling merchandise to retailers; to industrial, commercial, institutional, farm, construction contractors, or professional business users; or to other wholesalers; or acting as agents or brokers in buying merchandise for or selling merchandise to such persons or companies.	Industrials (20)	20107010	Trading Companies and Distributors	Nonspecialised	0.0	5
				Consumer Discretionary (25)	25501010	Distributors	Nonspecialised	0.0	1
				Consumer Staples (30)	30101020	Food Distributors	Nonspecialised	0.0	1
				Health Care (35)	35102010	Healthcare Distributors	Nonspecialised	0.0	1
10	(5200-5999)	Retail Trade	This division includes establishments engaged in selling merchandise for personal or household consumption and rendering services incidental to the sale of the goods. In general, retail establishments are classified by kind of business according to the principal lines of commodities sold (groceries, hardware, etc.), or the usual trade designation (drug store, cigar store, etc.).	Consumer Discretionary (25)	25502020	Internet Retail	Nonspecialised	0.0	1
				Consumer Discretionary (25)	25503010	Department Stores	Nonspecialised	0.0	1
				Consumer Discretionary (25)	25504010	Apparel Retail	Nonspecialised	0.0	2
				Consumer Discretionary (25)	25504040	Specialty Stores	Nonspecialised	0.0	1
				Consumer Discretionary (25)	25504050	Automotive Retail	Nonspecialised	0.0	2

Appendix B-4 Industry Knowledge Transfer Costs Categorisation cont….

Group	SIC Codes	Industry	Description	GIC Sectors	GICS Sub-Industry Code	GICS Sub-Industry	Knowledge Specialisation	KS Code	No. of Companies
11	(6000-6199)	Finance	This division includes establishments operating primarily in the fields of finance and includes depository institutions, non-depository credit institutions, holding (but not predominantly operating) companies, other investment companies, brokers and dealers in securities and commodity contracts, and security and commodity exchanges.	Financials (40)	40101015	Regional Banks	Nonspecialised	0.0	1
				Financials (40)	40102010	Thrifts and Mortgage Finance	Nonspecialised	0.0	3
				Financials (40)	40201020	Other Diversified Financial Services	Nonspecialised	0.0	2
				Financials (40)	40201030	Multi-sector Holdings	Nonspecialised	0.0	1
				Financials (40)	40203010	Consumer Finance	Nonspecialised	0.0	3
12	(6200-6299)	Security & Commodity Brokers	This major group includes establishments engaged in the underwriting, purchase, sale, or brokerage of securities and other financial contracts on their own account or for the account of others; and exchanges, exchange clearinghouses, and other services allied with the exchange of securities and commodities.	Financials (40)	40201040	Specialized Finance	Mixed	0.5	2
				Financials (40)	40203010	Asset Management and Custody Banks	Mixed	0.5	13
				Financials (40)	40203030	Diversified Capital Markets	Mixed	0.5	1
				Financials (40)	40402010	Diversified REITs	Mixed	0.5	5
				Financials (40)	40402020	Industrial REITs	Mixed	0.5	1
				Financials (40)	40402040	Office REITs	Mixed	0.5	1
				Financials (40)	40402050	Residential REITs	Mixed	0.5	1
				Financials (40)	40402060	Retail REITs	Mixed	0.5	1
				Utilities (55)	55105010	Independent Power Producers and Energy Traders	Mixed	0.5	1
13	(6300-6999)	Insurance & Real Estate	This division includes establishments operating primarily in the fields of Insurance and real estate. Insurance covers carriers of all types of insurance, and insurance agents and brokers. Real estate includes owners, lessors, lessees, buyers, sellers, agents, and developers of real estate.	Financials (40)	40301020	Life and Health Insurance	Nonspecialised	0.0	1
				Financials (40)	40301040	Property and Casualty Insurance	Nonspecialised	0.0	1
				Financials (40)	40403030	Real Estate Development	Nonspecialised	0.0	2

Appendix B-5 Industry Knowledge Transfer Costs Categorisation cont….

Group	SIC Codes	Industry	Description	GIC Sectors	GICS Sub-Industry Code	GICS Sub-Industry	Knowledge Specialisation	KS Code	No. of Companies
14	(7000-8999)	Services	This division includes establishments primarily engaged in providing a wide variety of services for individuals, business and government establishments, and other organizations. Hotels and other lodging places; establishments providing personal, business, repair, and amusement services; health, legal, engineering, and other professional services; educational institutions; membership organizations, and other miscellaneous services, are included.	Industrials (20)	20201010	Commercial Printing	Mixed	0.5	1
				Industrials (20)	20201050	Environmental and Facilities Services	Mixed	0.5	4
				Industrials (20)	20201070	Diversified Support Services	Mixed	0.5	4
				Industrials (20)	20202010	Human Resource and Employment Services	Mixed	0.5	1
				Industrials (20)	20202020	Research and Consulting Services	Mixed	0.5	1
				Consumer Discretionary (25)	25301010	Casinos and Gaming	Mixed	0.5	2
				Consumer Discretionary (25)	25301020	Hotels, Resorts and Cruise Lines	Mixed	0.5	1
				Consumer Discretionary (25)	25302010	Education Services	Mixed	0.5	1
				Consumer Discretionary (25)	25401020	Broadcasting	Mixed	0.5	3
				Consumer Discretionary (25)	25401025	Cable and Satellite	Mixed	0.5	1
				Consumer Discretionary (25)	25401030	Movies and Entertainment	Mixed	0.5	1
				Consumer Discretionary (25)	25401040	Publishing	Mixed	0.5	2
				Health Care (35)	35102020	Healthcare Facilities	Mixed	0.5	2
				Health Care (35)	35203010	Life Sciences Tools and Services	Mixed	0.5	1
				Information Technology(45)	45101010	Internet Software and Services	Mixed	0.5	4
				Information Technology(45)	45102010	IT Consulting and Other Services	Mixed	0.5	4
				Information Technology(45)	45102020	Data Processing and Outsourced Services	Mixed	0.5	1
				Information Technology(45)	45103010	Application Software	Mixed	0.5	8
				Telecom Services (50)	50101010	Alternative Carriers	Mixed	0.5	2
				Telecom Services (50)	50101020	Integrated Telecommunication Services	Mixed	0.5	1

Appendix C-1 Bivariate correlation matrix for unrestricted model independent variables (n=271)

	Skills& Training	Contract Incentives	Staff Turnover	Research and Development	Dynamism	Volume/ Demand	Technology	Modifications	Competition	Subsidiaries	Overseas Revenues	Restructure	Performance Evaluation	New Management	Frequency	Industry	Proprietary	Big4	Capital Intensity	Growth	Financial Distress
Contract Incentives	.23**																				
Staff Turnover	.20**	-.04																			
Research and Development	-.04	-.04	-.09																		
Dynamism	.02	.11	-.19**	.01																	
Volume/demand	-.06	-.04	-.07	.11	.12*																
Technology	.19**	.10	-.04	.10	.38**	.03															
Modifications	.29**	.10	.00	.03	.09	.01	.12														
Competition	.09	.06	.05	.12*	-.08	-.08	.00	.01													
Subsidiaries	.09	.18**	.10	-.07	.02	-.22**	.05	.06	.10												
Overseas Revenues	.03	-.05	.00	.07	-.09	-.06	-.05	-.08	.17**	.18**											
Restructure	-.12	.03	.01	.02	.10	-.17	.11	-.04	.04	.07	.11										
Performance Evaluation	.33**	.12	.02	-.01	.12	.08	.11	.14	.02	.00	-.10	-.04									
New Management	.05	-.05	.02	-.05	.02	-.05	.06	-.02	-.08	.01	-.01	.12	.04								
Frequency	.07	.22**	.06	-.07	.01	-.22	.02	.05	.27**	.59**	.19**	.25**	.03	-.05							
Industry	-.06	-.10	-.08	.11	-.03	.33**	-.17**	-.09	.03	-.12	.13	-.08	.03	-.04	-.11						
Proprietary	.03	.12	.01	.00	-.02	-.08	.10	.01	-.02	.05	-.01	.00	-.03	.11	.08	-.08					
Big4	-.06	.11	.05	.05	-.05	-.14*	-.03	.08	.11	.23**	.08	.13*	-.02	.01	.25**	-.15*	.05				
Capital Intensity	-.08	-.08	-.14*	.33**	-.03	.25**	-.03	-.05	.05	-.06	-.05	-.08	.11	.04	-.09	.17**	.02	.00			
Growth	.07	.05	.02	.00	.09	.13*	.00	.00	.01	-.03	-.03	.04	.02	-.03	-.06	.07	.10	.03	.13*		
Financial Distress	-.13*	-.17**	-.11	.13*	-.01	.40**	-.03	-.11	-.10	-.19**	-.05	-.13*	-.09	.05	-.25**	.35*	-.12	-.16	.13*	-.05	
Leverage	.00	-.01	-.02	-.12*	-.04	-.30**	.05	.06	-.01	.18**	-.01	.14*	-.04	.08	.19**	-.37**	.04	.05	-.16**	-.15*	-.20**

Note * and ** , correlation statistically significant at 5% and 1% levels (2-tailed)

Appendix C-1 Bivariate correlation matrix for unrestricted model independent variables (n=125)

	Training Externals	Contract Duration	Skills & Training	Contract Incentives	Staff Turnover	Research and Development	Dynamism	Volume/Demand	Technology	Modifications	Competition	Subsidiaries	Overseas Revenues	Restructure	Performance Evaluation	Performance Quality	New Management	Frequency	Industry	Proprietary	Big4	Capital Intensity	Growth	Financial Distress
Contract Duration	.03																							
Skills & Training	.48**	-.03																						
Contract Incentives	.13	.22**	.16																					
Staff Turnover	.12	.19*	.19	-.07																				
Research and Development	-.04	-.09	-.11	-.10	-.10																			
Dynamism	-.06	.03	-.01	.13	-.15	.09																		
Volume/Demand	-.01	-.18*	-.19*	-.15	-.25**	.21*	.17																	
Technology	.11	.00	.17	.10	-.08	.03	.26**	-.03																
Modifications	.08	-.25**	.22**	-.02	-.06	.04	-.08	-.08	.04															
Competition	.04	-.05	.07	.00	.03	.02	-.08	-.11	.02	-.06														
Subsidiaries	-.04	.19*	.06	.16	.07	-.03	.06	-.28	.11	.03	.09													
Overseas Revenues	.17*	-.04	.03	-.01	-.13	.27**	-.05	-.02	-.01	-.02	.20*	.22*												
Restructure	-.07	.10	-.17	.05	.03	.25	.12	-.17	.13	.04	-.06	.09	.14											
Performance Evaluation	.17*	-.02	.36**	.10	-.04	.10	.19*	.09	.12	-.01	-.01	-.09	-.04	-.04										
Performance Quality	.09	-.13	.08	-.07	.09	.06	-.05	.08	.10	.21*	.05	-.04	.08	.02	.21*									
New Management	.02	.15	.04	-.04	-.02	-.04	.04	-.09	.07	-.07	-.05	.01	-.11	.26	.07	-.07								
Frequency	.03	.17	.01	.17	.03	-.04	.02	-.31**	.04	.00	.24**	.77**	.20*	.21*	-.05	.03	-.03							
Industry	-.07	-.07	-.02	-.14	-.16	.07	.05	.44**	-.03	-.02	-.14	-.16	.15	-.10	.11	.02	-.01	-.24**						
Proprietary	-.09	.04	-.02	.10	-.02	-.03	-.01	-.09	.16	-.09	.01	.00	-.07	.04	-.01	-.14	.16	-.02	.02					
Big4	-.08	.09	-.18*	.03	.01	.03	-.06	-.21*	-.08	.10	.06	.22**	.19	.19*	-.12	-.03	-.02	.25**	-.24**	-.08				
Capital Intensity	-.12	-.12	-.13	-.12	-.17	.07	-.04	.29**	-.04	-.14	.01	-.07	-.02	-.09	.09	-.07	.00	-.11	.16	.05	-.05			
Growth	.09	-.15	.01	-.02	.05	.28**	-.04	.18	-.05	.06	.04	-.07	.09	.07	.03	-.05	-.19*	-.08	.11	.11	.02	.14		
Financial Distress	-.10	-.04	-.08	-.22**	-.23**	.08	-.01	.48**	-.15	-.09	-.13	-.16	-.16	-.24**	.00	-.17	.06	-.32**	.44**	.02	-.20*	.20*	.03	
Leverage	.05	.13	.11	.02	.09	-.07	-.02	-.42**	.00	.16	-.01	.24**	.01	.12	-.12	-.04	.12	.30**	-.46**	-.01	.13	-.22*	-.15	-.35**

Note * and ** , correlation statistically significant at 5% and 1% levels (2-tailed)

Appendix D-1 Complete List of Variables in Alphabetical Order

Dependent Variables:	
DV_1	the proportion of risk management services outsourced by category where 0=0%; 1=1-10%; 2=11-25%; 3=26-49%; 4=50-74%; 5=74-90%; 6=90-99%; 7=100%
DV_2	a dichotomous variable for outsourcing of risk management services; 1 if any risk management services are outsourced, 0 otherwise.
DV_3	an outsourcing variable for risk management services where 1 equals high with more than 25 per cent of risk management activities outsourced and 0 equals low with 25 per cent or less outsourced.
Independent Variables:	
Big4	Big4 = a dichotomous variable where 1 equals external supplier of risk management services and/or external auditor is a Big4 accounting company, 0 otherwise.
Capital Intensity	Capital Intensity = the ratio of fixed assets to operating revenue, standardised and mean centred.
Competition	Competition = the degree of competition in the industry sub sector calculated as the Herfindahl-Hirschman Index, rescaled, standardised and mean centred. A higher score indicates greater environmental uncertainty due to a more competitive environment.
Contract Duration	a categorical variable for the average length of contract with an external provider of risk management services, 1 equals less than 1 year, 2 equals 1 to 3 years and 3 equals more than 3 years.
Contract Incentives	the use of contract incentives to promote staff retention in risk management activities from the standardised mean centred score for survey item 12. A higher score indicates greater asset specificity for risk management activities.
Dynamism	the perceived dynamism of the external environment facing the company from the standardised mean centred score for survey item 18. A higher score indicates greater environmental uncertainty.
Financial Distress	a dichotomous variable which equals 1 if the company makes a loss in two of three previous years, 0 otherwise.
Frequency	the mean centred average of the standardised scores for the number of employees, total revenue and total assets. A higher score indicates more frequent risk transactions.
Growth	the percentage change in total assets over previous three years, standardised and mean centred.
Industry	control variable for industry knowledge transfer costs measured by a categorical variable where 0 equals low, 0.5 equals medium and 1equals high. A higher value indicates greater industry knowledge transfer costs.
Leverage	total liabilities divided by total assets, standardised and mean centred.

Appendix D-2 Complete List of Variables in Alphabetical Order cont.

Independent Variables cont:	
Modifications	the extent of modifications/adoptions required for risk management activities to suit different divisions/departments from the standardised mean centred score for survey item 17. A higher score indicates greater environmental uncertainty due to diversity.
New Management	equals 1 if the CEO changed in the period 2008-2009, 0 otherwise. A value of one indicates greater behavioural uncertainty for new management with regard to existing staff.
Overseas Revenues	the proportion of total revenue from overseas sales, standardised and mean centred. A higher proportion indicates greater environmental uncertainty.
Performance Evaluation	the degree of perceived difficulty in measuring performance of any existing or potential external consultants engaged for risk management activities from the standardised mean centred score for survey item 10. A higher score indicates greater behavioural uncertainty.
Performance Quality	the degree of difficulty in evaluating the quality of outsourced risk management activities from the standardised mean centred score for survey item 16. A higher score indicates greater behavioural uncertainty.
Proprietary	a categorical variable where 0 equals none, 1 equals less than 50 per cent and 2 equals more than 50 per cent from survey item 20.
Research and Development	expenditure on research and development as a proportion of operating revenues, standardised and mean centred. A higher proportion indicates greater asset specificity for risk management activities.
Research and Development Dummy	equals 1 if high expenditure on research and development versus 0 if low expenditure on research and development. A value of 1 indicates higher asset specificity.
Research and Development Dummy*Dynamism	Multiplicative interaction variable for research and development and dynamism
Research and Development Dummy *Volume/Demand	Multiplicative interaction variable for research and development and Volume/Demand
Research and Development Dummy *Technology	Multiplicative interaction variable for research and development and Technology
Research and Development Dummy*Modifications	Multiplicative interaction variable for research and development and Modifications
Research and Development Dummy* *Competition	Multiplicative interaction variable for research and development and Competition

Appendix D-3 Complete List of Variables in Alphabetical Order cont.

Research and Development Dummy*Subsidiaries	Multiplicative interaction variable for research and development and Subsidiaries
Research and Development Dummy*Overseas Revenues	Multiplicative interaction variable for research and development and Overseas Revenues
Research and Development Dummy*Restructure	Multiplicative interaction variable for research and development and Restructure
Research and Development Dummy* Performance Evaluation	Multiplicative interaction variable for research and development and Performance Evaluation
Research and Development Dummy* New Management	Multiplicative interaction variable for research and development and New Management
Research and Development Dummy*Frequency	Multiplicative interaction variable for research and development and frequency
Restructure	Restructure = equals 1 if the company has had any restructures, acquisitions or mergers in the past 3 years and 0 otherwise. A value of one indicates greater environmental uncertainty.
Skills and Training	the depth of company specific skills, knowledge and training required computed from the standardised mean centred score for four survey items 7,8,9 and 11. A higher score indicates greater asset specificity for risk management activities.
Staff Turnover	staff turnover in risk management relative to other service functions from the standardised mean centred score for survey item 15. A higher score indicates greater asset specificity for risk management activities.
Subsidiaries	the number of subsidiaries, standardised and mean centred. A higher number indicates greater environmental uncertainty.
Technology	the rate of technological change in a company's industry from the standardised mean centred score for survey item 19. A higher score indicates a higher rate of technological change.
Training Externals	equals 1 if training provided to external suppliers of risk management activities, 0 otherwise.
Volume/Demand	variance (standard deviation) in sales over the past three years, standardised and mean centred. A higher variance indicates greater environmental uncertainty.

Appendix E-1 Regression Results for Interaction Effects

Dependent Variable – *Proportion of risk management services outsourced (n=271)*

Model 3		**Coefficient**	**t**	**P**	**VIF**
(Constant)		1.49	4.67	0.00	
Research and Development Dummy	-	-0.05	-0.27	0.79	1.47
Dynamism	-	0.16	1.13	0.26	2.19
Volume/Demand	-	0.65	2.36	0.02	2.71
Technology	-	-0.21	-1.69	0.05	2.23
Modifications	+	0.20	1.81	0.04	1.93
Competition	+	-0.92	-2.34	0.02	1.86
Subsidiaries	+	0.01	3.13	0.00	2.56
Overseas Revenues	+	-0.48	-1.37	0.17	2.48
Restructure	+	0.43	1.35	0.09	2.08
Performance Evaluation	-	-0.05	-0.56	0.57	2.08
New Management	+	0.50	1.19	0.23	1.98
Frequency	-	-0.39	-1.83	0.04	5.90
Industry	-	0.39	1.60	0.11	1.62
Proprietary	-	0.28	1.94	0.05	1.14
Big4	+	0.13	0.86	0.39	1.18
Capital Intensity	+	-0.00	-0.48	0.63	1.20
Growth (previous 3 years)	+	0.03	0.40	0.69	1.13
Financial Distress	+	-0.14	-0.80	0.43	1.50
Leverage		-0.49	-2.11	0.04	1.35
Research and Development Dummy* Dynamism	-	-0.48	-2.22	0.03	2.06
Research and Development Dummy* Volume/Demand	-	0.29	0.76	0.45	2.55
Research and Development Dummy* Technology	-	0.00	0.00	1.00	1.97
Research and Development Dummy* Modifications	-	-0.25	-1.48	0.07	1.97
Research and Development Dummy* Competition	-	-0.45	-0.70	0.49	1.90
Research and Development Dummy* Subsidiaries	-	0.00	-0.39	0.70	2.58
Research and Development Dummy* Overseas Revenues	-	-0.21	-0.42	0.67	2.67
Research and Development Dummy* Restructure	-	0.41	0.82	0.41	2.35
Research and Development Dummy* Performance Evaluation	-	0.22	1.69	0.10	2.08
Research and Development Dummy* New Management	-	0.16	0.26	0.80	2.02
Research and Development Dummy* Frequency	-	0.13	0.49	0.62	5.57

R squared = .25, adjusted R squared = .16, F=2.66, P=0.00

Appendix F-1 Summary of the results of hypothesis testing

Hypothesis	Operationalised Dimension	Results
H1: Companies with more transaction-specific human assets outsource less risk management activities than those with less transaction-specific human assets.	Company specific knowledge and training	• No support for whole sample (271). • No support for subsample (125).
	Contract characteristics	• No support for whole sample (271). • No support for subsample (125).
	Staff turnover	• No support for whole sample (271). • Supported in subsample of outsourcing companies for decision to outsource high versus low (125).
	Expenditure on Research and Development	• Supported in whole sample (271). • No support for subsample (125).
	Training for external suppliers	• No support - significant in non-predicted direction for subsample of outsourcing companies (125).
	Contract duration for external suppliers	• No support - significant in non-predicted direction for subsample of outsourcing companies (125).
H2a: A negative association exists between the choice to outsource risk management activities and volume/demand uncertainty and uncertainty due to technological factors.	Volume/demand (environmental dynamism).	• No support for whole sample (271). • Supported in subsample of outsourcing companies (125).
	Volume/demand uncertainty.	• No support -significant in non-predicted direction in the whole sample (271). • No support – significant in non-predicted direction for subsample of outsourcing companies (125).
	Technological uncertainty	• Supported in whole sample (271) significant results for proportion outsourced and marginally significant for decision to outsource. • Supported in sub-sample of outsourcing companies (125).

Appendix F-2 Summary of the results of hypothesis testing

H2b: A positive association exists between the choice to outsource risk management activities and uncertainty arising from environmental diversity.	Modifications	• No support for whole sample (271). • No support for subsample (125).
	Competition	• No support - significant in non-predicted direction in the whole sample (271) for proportion outsourced, no support for the decision to outsource. • No support – significant in non-predicted direction for subsample of outsourcing companies (125).
	Subsidiaries	• Supported in whole sample (271). • Supported in sub-sample of outsourcing companies (125).
	Proportion of overseas revenue.	• No support – significant in non-predicted direction in the whole sample (271) for proportion outsourced, no support for decision to outsource. • No support in subsample of outsourcing companies (125) – marginally significant in non-predicted direction.
	Restructure, acquisition or merger in last three years	• Supported in whole sample (271) significant results for proportion outsourced and marginally significant for decision to outsource. • Supported in sub-sample of outsourcing companies (125).
H3: An association exists between the choice to outsource risk management activities and behavioural uncertainty.	Performance evaluation of external suppliers of risk management services	• No support for whole sample (271) • No support for subsample (125).
	Quality evaluation of performance of external suppliers of risk management services	• No support in subsample (125).
	New Management	• Supported in whole sample (271). • No support in subsample (125).
H4: Companies that undertake risk management activities frequently will conduct them in-house and conversely infrequent transactions are associated with outsourcing.	Composite variable for company size	• Supported in whole sample (271). • Supported in sub-sample of outsourcing companies (125).

Appendix F-3 Summary of the results for control variables

Controls:		
A negative association exists between the choice to outsource risk management activities and the industry knowledge transfer costs	Industry knowledge transfer costs	• No support in whole sample (271). • No support for subsample (125).
A negative association exists between the choice to outsource risk management activities and exposure to commercial in confidence/proprietary information.	Exposure to commercial in confidence/proprietary information	• No support for whole sample (271). • No support for subsample (125) – marginally significant in non-predicted direction for high versus low outsourced.
A positive association exists between the choice to outsource risk management activities and the reputation of the external supplier.	Reputation of external supplier of risk management activities	• Supported in whole sample (271) significant results for decision to outsource, not significant for proportion outsourced. • No support for subsample (125).
A positive association exists between the choice to outsource risk management activities and increasing capital intensity.	Capital intensity	• Supported in whole sample (271) significant results for decision to outsource, not significant for proportion outsourced. • No support for subsample (125) - marginally significant in non-predicted direction for high versus low outsourced.
A positive association exists between the choice to outsource risk management activities and short term growth.	Growth (previous 3 years)	• No support for whole sample (271) • No support for subsample (125)
A positive association exists between the choice to outsource risk management activities and financial distress.	Financial Distress	• No support - significant in non-predicted direction in the whole sample (271) for the decision to outsource, no support for proportion outsourced. • Supported in sub-sample of outsourcing companies (125) significant results for high versus low outsourced, not significant for proportion outsourced.
A negative association exists between the choice to outsource risk management activities and exposure to commercial in confidence/proprietary information.	Leverage	• No support - significant in non-predicted direction in the whole sample (271). • No support for subsample (125) - marginally significant in non-predicted direction for high versus low outsourced.